SUPPLEMENT.

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FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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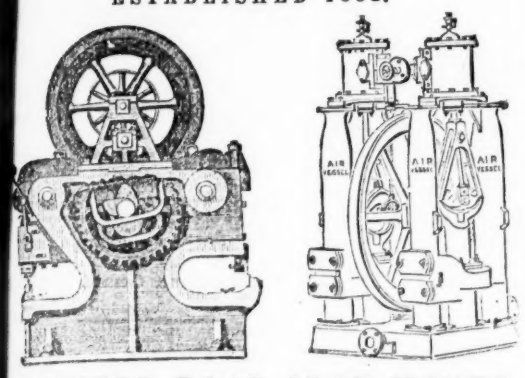

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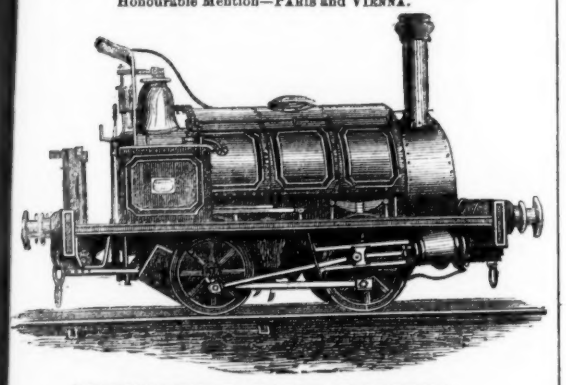

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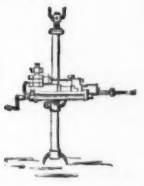

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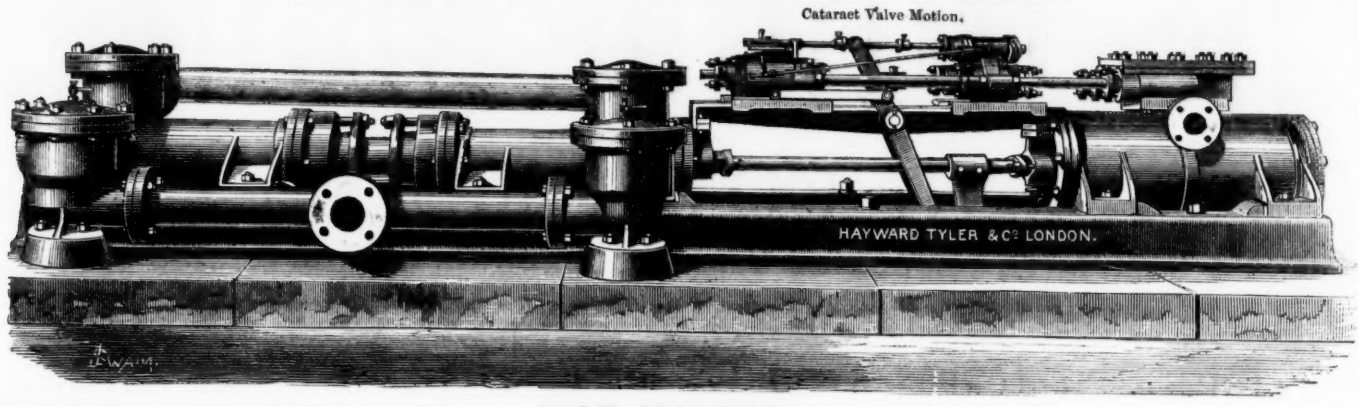

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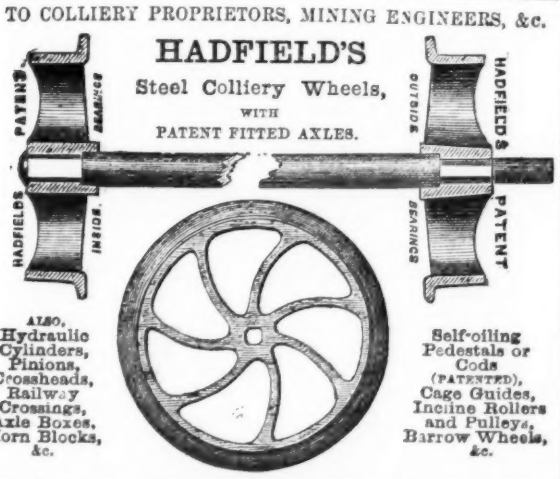

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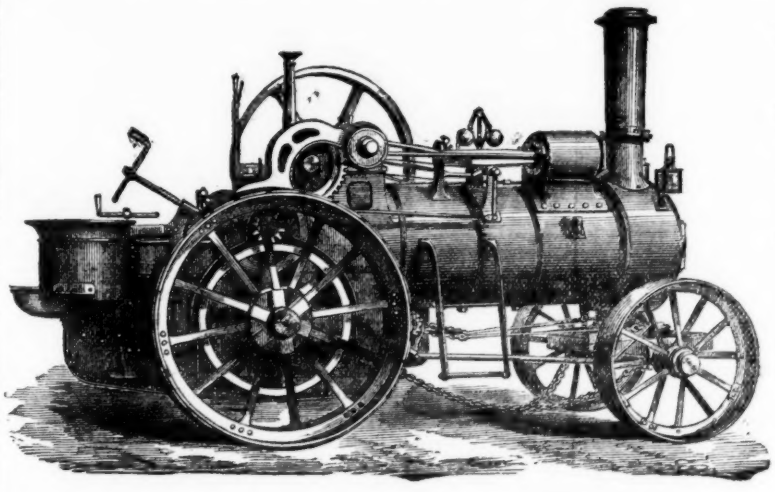

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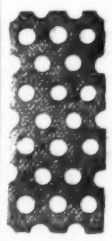

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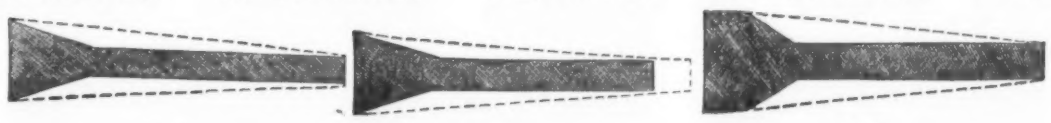

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A NEW SYSTEM OF SINKING AT THE CANNOCK AND HUNTINGTON COLLIERY.

Those of the public interested in mining enterprises have been aware for some time that a new mode of sinking shafts is about to be tried in England, but the nature of the process to be adopted has not been generally understood. That to which we refer is known as the Kind-Chaudron mode of sinking, being so named from the two eminent engineers who have invented and perfected the process referred to. By this method of sinking a shaft may be sunk through water-bearing strata, and lined throughout with the most perfect iron casing, the whole of the operation being carried on from the surface. At first sight it would appear that such a mode of sinking would be an impossibility, but the fact that some 30 or 40 shafts have been successfully sunk on the Continent on this plan places its feasibility beyond a doubt.

The Cannock and Huntington Colliery Company, under a lease from Lord Hatherton, some time since acquired mining rights over about 1000 acres at Huntington, in the neighbourhood of Cannock, and it having been ascertained by boring conducted by the Diamond Rock-Boring Company that known coal measures lay beneath the land in question, it only remained to be determined how the coal should be reached. The boring, which had been carried down to a depth of 218 yards, disclosed the existence of pebble beds and conglomerate at a depth of from 50 to 80 yards, which were not only charged with water at the rate of 250 gallons per minute, but which freely discharged it through the bore-hole, the water rising to a height above the surface of about 10 ft. in any pipe placed to receive it. Any shaft, therefore, sunk in that ground would have been, in fact, an artesian well, and as the quantity of water which would be discharged through it was in no way ascertainable, the question of sinking was one for most anxious consideration by the directors of the company. They might possibly, by the erection of very powerful engines and pumps, have drained any shaft beink sunk during the progress of the works and while the necessary iron lining or tubbing was placed in it, but the circumstances of the case were so exceptional that they felt justified in adopting any process, however novel, by which the enormous expense of sinking in such strata could be avoided.

Messrs. North and Son, of Dudley, the engineers of the company, had introduced to the notice of the directors the Kind Chaudron method of sinking, and had pointed out fully its peculiar advantages. A visit by the directors to Belgium and France, where pits in progress of excavation were inspected, confirmed the favourable impression which they had formed of this method of sinking, and, after careful consideration, they determined to take the responsibility of adopting the Kind-Chaudron process at Huntington. An arrangement was forthwith made with M. Chaudron to undertake the sinking of two shafts for the company to a depth of about 140 yards each. Special machinery was ordered, foundry and pit-sheds were erected, and what was not long since farming land turned into the busy scene of which we will endeavour to give a slight sketch.

On approaching the colliery the first thing that will strike the visitor is the very high and novel-shaped wooden shed which stands over pit No. 1 (at the other pit No. 2 is being erected). A large foundry-shed and a very fine chimney-shaft will also attract attention. The chief interest at present, however, centres in the operations in the pit-shed. To enter this the visitor will have to mount up steps a height of some 15 or 20 ft. above the surface of the ground. Passing through the door at the top he will find himself in what, for want of a better subject for comparison, we may describe as a very lofty barn with a boarded floor. Having arrived here, he will perhaps ask where the shaft is being sunk, for nothing is to be seen of it. In the middle of the floor, however, there is a circular hole of about 1 ft. in diameter, and, if the boring is going on, through this will pass an iron rod, which is suspended by a gigantic screw and chain to the end of an oak beam some 10 ft. above the floor. A capstan bar through the rod, manned by four labourers, completes all the boring apparatus that is at first sight visible. The end of the beam from time to time slowly rises for about 2 ft., and suddenly drops again, letting the rod and all that is suspended to it underneath the floor fall with it, the men at the capstan bar walking slowly round as the boring rod rises and falls.

While this monotonous process is going on, the machinery which works the beam and that what which raises the tools can be examined. The beam, which projects into the shed from a building joining on to it, and which we may call an annexe, is of oak, and is about 25 ft. long; its further end is attached to and is drawn down by a piston working in a large cylinder fixed below the beam, and to this steam is admitted at intervals. The beam, therefore, pulled down by the piston at one end and by the weight of the boring apparatus at the other, oscillates under the control of the engineer.

Having examined the beam, we may pass further on into the annexe, and inspect the steam-engine which supplies the power necessary to raise and lower the boring apparatus. This engine is a powerful one, working a train of cog-wheels, the last carrying a drum round which an enormous rope is wound. This rope, it will be seen, passes up a covered way to the pulley at the top of the pit-shed, where it hangs high up overhead ready for use. The time at length arrives for lowering the dredge or basket, and if the visitor will return to the shed he will see this operation. At a signal from the chief borer the motion of the beam is stopped, two baulks of timber are slid up on each side of the boring-rod, and an iron fork or key is laid on them which just admits through it the passage of the smaller part of the rod, but not of the shoulder of any screw-joint in it; the beam is slightly lowered, and the whole weight of the underground apparatus is borne by the timber we have just spoken of. The chain and screw with the heavy iron swivel at the end of them are detached from the rod of the boring apparatus, and the connection between them and the oscillating beam is severed. The rope now descends from the top of the pit-shed, and being hooked on to the end of the beam lifts it gently up; the men are ready at their posts, and a roller having been slipped under the other end the whole mass of oak to its iron attachments, weighing some 5 or 6 tons, is quietly slid back and laid to rest out of the way for a time as gently as if it were a baby being turned over in its cradle. The rope now descends again, is attached to the boring-rods, and in a few seconds the first length is raised above the ground through the hole in the floor we first mentioned; the iron key is again brought into use, while the upper rod is detached and put on one side. The rod in the drill is at length reached, and when this is made fast to the rope the men rapidly remove the floor boards in the middle of the shed, and the observer finds himself standing at the edge of the pit mouth.

On looking down it will be seen that underneath is a circular shaft of some 20 ft. in diameter, full of water. The surface of the water is now, perhaps, not more than 15 ft. below the floor of the shed, but when the lower water-bearing strata are reached will, probably, rise some feet higher. The engine now moves again, and the drill is brought into daylight. As soon as it appears the floor boards are replaced, and this part of the apparatus can be approached and examined. When we call the boring tool a drill we do so for want of a better expression, and not that the word properly describes the implement in question. The one now being used at Huntington, which excavates a shaft between 6 and 7 ft. in diameter, is the smallest of those that will be used, and yet its weight is about 7 tons. It consists of a heavy wrought-iron beam, on the under side of which are several very formidable teeth. Above stands a vertical iron shaft, which may be about 15 ft. long, and on each end of it are attached heavy beams of timber that serve to guide the machine in the hole it has to form in the earth.

The drill is soon swung beneath a carriage, which runs on ralls high up in the shed, and is then passed to one side. As rapidly the large dredge is brought over the pit from the other side of the shed, and attached to the rope. This dredge is, in fact, a gigantic iron bucket, made so as to be capable of being easily turned over that its contents may be emptied out of the large window or opening formed in one side of the shed for the purpose. The bottom of the dredge, however, is hinged, and opens upwards in two parts.

The engine is again started, the dredge disappears from sight, the floor is closed, rod after rod is attached and lowered, and when the last rod is fastened the beam is again brought back to its place, and the dredging apparatus moved up and down a few times, being turned round at the same time by the capstan bar. The beam is again detached, and run on one side, the dredge is raised, and when slung underneath its carriage is pushed forward to the window, which is now opened, and by means of a rope and winch gently turned over, discharging its contents of water and mud, broken stones and sand, into a shoot constructed outside the shed. The mud that comes up is, to a great extent, sufficiently liquid to run away down the ditches and over the adjacent grounds, and but little spoil at present has accumulated near to the pit mouth.

We have now described the work as far as it has yet been carried on. The larger drill has yet to be used; this will excavate the pit to the full size of about 16 ft. diameter, but the smaller drill always precedes the larger one, and thus a small shaft is always sunk in advance of the full-sized one, the advantage of this being that the earth loosened by the action of the larger drill always falls into the smaller shaft, by which it can be easily removed by the dredge.

There is no doubt that with continued practice the labourers now employed will work with even greater precision than they do at present in handling the very heavy machines whose motions they have to direct, but with the short discipline they have had it will certainly strike every visitors to the colliery that they work more like artilleryman at heavy gun drill than colliers—every tool seems ready to hand, every man knows his place, the work goes on silently and rapidly, the men working no doubt all the better from being in a dry, well-swept, and well-arranged shed, rather than on a pit bank, where dirt, wet, and cold exhaust their energies and impede their progress. The manufacture of the tubbing, which will be carried on near to the pit mouth, and the mode of sinking it when the boring is completed, must form the subject of another notice. At present we have only described a process which can be seen in operation, and which from its completeness and novelty is certainly one of the most remarkable in South Staffordshire.

COAL MINING EXPLORATIONS IN DURHAM.

At the present time, and for the last three or four years, there has been a great deal of activity displayed in the development of new collieries throughout the county of Durham—the most important and extensive centre of the English coal trade. These new ventures have in some cases been attended with much risk and not a little loss, but they are valuable in their way as tending to demonstrate the condition of the coal seams of the county in localities hitherto unproved, and of shedding light upon the question of the extent and duration of our coal resources. The most important of the many new colliery undertakings projected in the North during the last few years are those of Mainsforth, near Ferryhill; Windlestone, near Bradbury; and Whitburn, near Sunderland. Upon each of these we shall offer our readers some information.

The Mainsforth Colliery has been sunk in a locality that has not heretofore been much worked, although it promises before long to be almost as prolific a centre of the Durham coal trade as either Bishop Auckland, Gateshead, or Fence Houses. The site of the colliery is within a few hundred yards of the Ferryhill Station. To the south of the present site the projectors some time in 1871 began the sinking of a shaft, and actually carried the work to a considerable length, when a quicksand caused the whole fabric to fall in, involving a very heavy loss, and causing grievous disappointment. But the owners, nothing daunted, began the sinking of another shaft, within 150 yards of the one that had been wrecked, in the summer of 1873, and the shaft has since been in process of sinking. The following section of the strata passed through since this shaft was begun will show very clearly the progress of the work, and will be all the more interesting as it is now published for the first time:—

AN ACCOUNT OF STRATA SUNK THROUGH IN THE B PIT, MAINSFORTH COLLIERY, COMMENCED AUG. 7, 1873.

No.		Fms.	ft.	in.	Fms.	ft.	in.
1.	Soil		0	1	0		
2.	Strong blue clay		1	4	0		
3.	Soft brown limestone, with water		3	4	0		
4.	Soft brown limestone, with water at the bottom		1	3	0		
5.	Mild limestone		2	1	0		
6.	Light-coloured limestone		2	2	0		
7.	Mild limestone, with a strong feeder of water at top		1	1	0		
8.	Hard limestone		0	3	0		
9.	Mild limestone, with water		2	4	6	= 16	5 6
10.	Hard brown limestone, much honeycombed		3	5	4		
11.	Hard brown limestone, with partings and water		4	3	5		
12.	Brown and white limestone, very hard, and water		1	2	0		
13.	Blue and white limestone		0	2	3	— 10	1 0
14.	Brown limestone, with a little water at parting		0	2	9		
15.	Mixed pannels of blue and brown limestone		2	2	3		
16.	Hard blue limestone, with brown girdles		2	2	4		
17.	Hard blue limestone, light-blue and yellow partings		1	2	0		
18.	Blue limestone, with thin black partings		2	1	2		
19.	Brown limestone, with thin black partings		0	1	8	— 9	0 2
20.	Light-coloured limestone, with a strong feeder of water at the bottom		0	0	8		
21.	Grey metal		0	2	5		
22.	Hard sandstone, soft at the bottom		0	3	5		
23.	Soft metal, light coloured		1	1	8		
24.	Light metal, mixed with red pebbles		0	2	3		
25.	Red metal		0	2	9		
26.	Red post		0	2	8		
27.	Grey post		1	3	8		
28.	Grey metal		1	0	4		
29.	Blue metal, mixed with thin red girdles		0	4	8		
30.	Grey metal, with thin red girdles		1	5	0		
31.	Dark-blue metal		0	4	8		
32.	Black stone		0	2	1		
33.	Seggar		0	0	3		
34.	COAL, THREE-QUARTER SEAM (Oct. 6, 1874)		0	2	8		
35.	Soft seggar		0	1	4		
36.	Seggar, strong, with iron ball		0	3	0		
37.	Strong grey metal, jointy		1	2	8		
38.	Grey post		0	1	6		
39.	Grey metal, with post girdles		0	4	7		
40.	Black metal		0	1	8		
41.	Dark-grey metal		0	3	0		
42.	Grey metal, with post girdles		1	3	0		
43.	Blue metal, with iron girdles		0	4	2	— 16	4 1
44.	Black stone		0	0	5		
45.	COAL, THREE-QUARTER SEAM (got Oct. 29, 1874)		0	4	6	— 0	4 11
46.	Seggar		0	1	8		
47.	Post		0	1	10		
48.	Blak stone		0	2	0		
49.	Grey metal, with post girdles		2	4	0	— 3	3 6
50.	Grey metal		2	0	1		
51.	Coal seam		0	1	9		
52.	Thill stone		0	0	4		
53.	Grey post		0	4	1		
54.	Hard post girdle		0	1	0		
55.	Grey metal, with thin post girdles		2	4	0		
56.	Grey metal, with iron girdles		1	2	4		
57.	Coal, top part of main coal seam		0	1	6½		
58.	Seggar		0	4	2		
59.	MAIN COAL SEAM (Oct. 12, 1875)		0	3	8	— 8	4 11½
60.	Seggar		0	2	8		
61.	Grey post		0	3	10		
62.	Light-grey metal, much like seggar		0	1	3		
63.	Grey post, with grey metal partings		0	5	8		
64.	Grey post		0	3	5		
65.	Grey metal and post, mixed with a few iron balls at the bottom		0	3	9		
66.	Blue metal, with iron ball and coal pipes, and full of prints		0	3	1	— 3	5 8
67.	Dark metal, with coal pipes and prints		0	0	7		
68.	Grey metal, with iron balls		0	2	11		
69.	Grey metal, with post girdles		0	2	0		
70.	White post, with metal parting and water		0	1	8		
71.	Brown whin girdle		0	0	4		
72.	Grey post, with metal parting		0	1	4½	— 1	2 10½
73.	White post, with metal partings, and water about 80 gallons per minute		2	1	5		
74.	Seggar		0	0	8		
75.	Black stone, mixed with coal pipes and prints		0	0	2		
76.	Grey metal, and post girdles		4	0	4	— 6	2 7
77.	Grey metal, with coal partings		0	1	5		
78.	Black stone and coal mixed		0	0	2½		
79.	COAL		0	4	0½		
80.	Seggar, with ironstone nodules		0	3	0		
81.	Grey metal and post girdles		2	1	3		
82.	Coarse coal		0	0	6		
83.	Dark-blue metal		0	2	6		
84.	Blue metal and ironstone balls		0	2	6		
85.	Grey metal and post girdles		0	2	0		
86.	Grey post and metal partings		3	3	9		
87.	Grey metal and ironstone balls		3	2	10		
88.	Black stone and coal pipes		0	0	2½		
89.	COAL, LOW MAIN (April 8, 1876)		0	2	0½	— 11	2 7
90.	Dark thill stone		0	0	4		
91.	Fine light-coloured seggar		0	1	4		
92.	Dark and light coloured seggar, in thin layers		0	2	3		
93.	Hard coarse coal		0	0	4		
94.	Hard post like seggar, with iron balls		0	2	8		
95.	Strong grey metal, inclined to post		0	5	9	— 2	0 8
96.	White post, with metal partings, mixed with whin next the top, and 400 gallons of water per hour; mixed with grey leafy post the last 2 fathoms		4	3	9		
97.	Black soft metal, mixed with coal pipes		0	0	8		
98.	COAL (got May 16, 1876)		0	1	5	= 4	5 10
99.	Dark-grey post, with white post girdles		1	3	8		
100.	Strong black metal		0	1	0		
101.	Coal		0	0	7	= 1	5 3
102.	Strong grey metal, inclining to and mixed with post		1	2	5	= 1	2 5
103.	White post girdle		0	1	9		
104.	Grey metal		0	0	8		
105.	White post, mixed with dark leafy post		2	4	10		
106.	Grey metal and ironstone girdles		1	1	9		
107.	COAL, HUTTON SEAM (July 13, 1876)		0	2	0½	— 4	5 0½
108.	Seggar, strong at the bottom		0	1	6		
109.	Grey metal, with post girdles		2	1	4		
110.	Grey post, hard, and very jointy, and about 80 gallons of water per minute		1	1	8		
111.	Grey metal and post girdles		0	2	10		
112.	Black mussel bed		0	0	4		
113.	Grey metal, with iron balls		0	0	7		
114.	Black stone		0	0	5		
115.	Grey metal, mixed with ironstone		1	0	4		
116.	COAL (Jan. 24, 1877)		0	2	4	= 5	5 4
117.	Dark thill		0	0	9	= 0	0 9
	Present depth					111	2 9½

The following is a section of the strata sunk through in the second pit at Mainsforth:—

No.	A PIT, MAINSFORTH COLLIERY.	Fms.	ft.	in.
1.	Soil		0	1 0
2.	Soft blue clay		1	5 0
3.	Soft light-coloured limestone, with a strong feeder of water		8	5 0
4.	Soft brown limestone, much broken and water		3	4 10
5.	Strong light-coloured limestone, mixed with brown, much honeycombed at the bottom, and water		2	3 0
6.	Hard brown limestone, with water		6	3 0
7.	Mild limestone, much broken and honeycombed, and a strong feeder of water from the south side		1	2 0
8.	Hard crutly brown limestone, with a big gullet on south side		1	4 2
9.	Hard blue and brown limestone mixed, and yellow on south side		5	3 8
	Total	32	1	8

REMARKS.

3. A 20 in. pumping set in here, 6 ft. stroke; engine going 11 strokes per minute.
4. ditto ditto ; ditto 18 ditto
5. ditto ditto ; ditto 22 ditto
6. Two 20 in. sets in here; engine going 15 strokes per minute. A gullet put in here, at the south side, with a strong feeder of water.
7. Took the 20 in. set out, and put in two 24 in. sets; engine going 17 strokes per minute, but took off to 13 strokes.
8. Gullet runs out at 26 fms. 4 ft.
9. Gullet coming in at the bottom of this.

We regret to learn that the gullet coming in from the hard blue and brown limestone at the depth of 30 fms. has been so intractable that the shaft has been allowed to fill with water, and operations are now practically discontinued, the sinkers confining their work almost exclusively to the other pit, where, it is expected, the Brockwell seam will speedily be reached. The whole enterprise has been unusually hazardous and costly, and may involve the owners in a total outlay of more than 250,000*l.* sterling.

The Windlestone Colliery, belonging to Messrs. J. and J. W. PEASE, of Darlington, was begun in 1872. Since then sinking operations have been continuously carried on. One pit has been sunk to the depth of 127 fms., and another to a depth of over 30 fms. At the former depth the Harvey seam was met with, of a total thickness of 6 ft. 4 in. This is a greater thickness than the seam usually assumes, but then the seam is interstratified with clay to the extent of 15 in., which renders it much less valuable than if it had only been 3 or 4 ft. thick, as it is found elsewhere.

The difficulties met with at Windlestone have chiefly arisen out of the huge feeders of water coming from the magnesian limestone formation. These feeders sometimes involved the pumping of over 3000 gallons of water per minute, and to keep up with this exigency very powerful pumping machinery has been employed. The winning from first to last is what viewers in Durham usually call a blind one—that is to say, the adventurers did not know what they were coming to until they reached it; and as Windlestone is situated beyond the outcrop of the proved coal measures of the county of Durham the adventure was altogether excessively risky. As it is, the Harvey seam has been found under circumstances so peculiar as to justify the conclusion that at or about this point there has been a considerable dislocation of the coal measures, which may in the further progress of sinking bring entirely new geological phenomena to light, and this expectation is further borne out by the fact that at the Chilton Colliery of the South Durham Coal Company, only about ¾ mile distant, a seam is met with and worked at the depth of 50 fms. that has given no trace of its existence at Windlestone. The Messrs. PEASE propose to continue their exploration to the Brockwell seam, which is expected to lie at a depth of about 180 fathoms. This will involve at least another year of continuous sinking, and will extend the whole duration of the winning to upwards of five years.

When we add that over the greater part of that time 60 to 100 men have been regularly employed; that the machinery has had to be altered and augmented again and again; and that the undertaking altogether has been a constant drain upon the resources of the proprietors, it will at once be understood that it has in no sense been child's play. On the other hand, however, the successful winning of the Brockwell seam at Windlestone would afford good hope that the coal measures of Durham extend over a greater workable area than has yet been proved, and so encourage others to prospect for coal in a wide district that has hitherto been avoided and neglected.

We must reserve for another occasion our remarks on the Whitburn Colliery enterprise, which is in some respects the greatest and most remarkable of the three, and in connection with which important experiments are now being made in the adoption of a new mode of sinking.

THE SOUTH STAFFORDSHIRE COLLIERIES, AND COAL TRADE.

SIR,—That many collieries are now under water in the Bilston district is a fact, and there can be little doubt (in the minds of mining men) that as the waters underground are daily increasing a considerable number of collieries will in turn be drowned out and closed forever, thus leaving the ungotten beds of coal, ribs and pillars, fireclay, ironstone, limestone, &c., past redemption under thousands of acres. The losses to individuals will be immense, and by no means light to the district at large. There is much gossip as to the course adopted by the Drainage Committee, and generally it is believed that if the pumping power had first been looked into, and placed on a fair and sound footing, then followed by surface works to the extent of the surplus of revenue, which would have greatly increased, the whole district might now have been in full working order; but it may be said by taking the surface works first they saved some cost in pumping. That must, I think, to some extent be admitted, but the answer is—and lost the whole of the minerals and the pumps for ever, which is, and will be, a great misfortune. Yes, a calamity to our South Staffordshire district, and render works, which have cost tens, yes hundreds, of thousands of pounds, of but little value. This is seen and felt, and will be more felt as districts become flooded. There are some who say the works will not be lost for want of coal; we shall be able to do as we are now doing for 100 years, or perhaps 200 or 300 years—get coal, coke, and ironstone from Wales, Yorkshire, Derbyshire, Durham, Lancashire, &c. Yes, it is true, there are great supplies to be had from those districts, but at what cost can we get coal, &c., from these places? Taking the average, it will be at least 5*s.* per ton, taking the weight into consideration, railways, and rolling-stock charges into account, over and above the price at which it is sold at the several districts which contribute towards our costly supply.

At first sight we may feel disposed to think that large importations of coal from other districts must tend to reduce the price very much. This is a mistake, it does not reduce the price of our district coal, but it effects the next best thing, which is in preventing our colliery owners who are not drowned out from advancing the price to a ruinous degree, as they did during the mad days of inflated

trade. From these few lines your readers will see that, although we do, and shall, get supplies from other districts, the coalowners left outside the daily increasing flood have an advantage over those colliery owners at a distance to the full extent of the cost of delivery and the difference in quality, it being well known that South Staffordshire is debtor to her superior coal for the exalted position she has ever held in the manufacture of best iron, and hence it is we Staffordshire men cannot refrain regretting that so large an area should be forever lost; and although we know some of our collieries have not turned out well to the shareholders of companies the causes heve been easy to explain (such as bad management, dishonest men, &c.), and as it has been ever since the writer can remember so it will ever be in South Staffordshire. He or they who have a good colliery, honestly and well managed, need nothing better; it has ever been a great source of wealth, and called the Staffordshire gold mine.—*Dudley, Feb.* 12. NATIVE.

EXPLOSIONS AND FIRES IN COAL MINES.

SIR,—Scarcely a week goes by but an explosion of fire-damp or a fire takes place in some coal mine or other. It is needless to refer to any in particular, for this has been going on for years, and certainly will until the use of safety-lamps be fully adopted. What is more common in reporting these fearful disasters than to see the remark "this was considered such a safe mine that naked lights were used, and no gas had been seen." It seems like a mockery to say so when as a matter of fact, there is no such thing as a safe coal mine, all being liable to be set on fire where the reckless use of naked lights exists. It may be asked what is the reason of this state of things? In my opinion it emanates from the men principally. They are accustomed to work with a candle, and the greatest difficulty is experienced in getting them to change; in fact, so wedded are they to candles that they prefer to pay for their own in preference to using safety-lamps supplied and paid for by the owners. In consequence the managers are unable to cope with this prejudice, and to insist upon the use of the best system of safety-lamps entirely. Many managers have said to me—"I wish it was made compulsory that no naked lights should be allowed in a pit." This is a matter for the Right hon. Mr. Cross to take in hand, and will have to be legislated upon sooner or later.

In Belgium the use of safety-lamps is not only compulsory, but the exact type of lamp to be used is also specified. All sorts of arguments may be advanced against the same system being carried out in England, but not one will hold ground. If fires are to be prevented in coal mines the only plan is to use a safety-lamp that will give the user a good light, but prevent him exposing the same, we shall then see this class of preventible catastrophies reduced to a minimum. I could say much more on this subject from results of experience extending over some years, but trust this will be sufficient to induced many managers to take this into their consideration, and not forget the sayings—

"That delay makes the danger,"
"Prevention is better than cure."

Worsley, Feb. 14. M. E. TEALE.

MINING EXPLOSIVES, AND THEIR COST.

SIR,—I have been much interested in several of the communications which have lately appeared in the Journal respecting the merits of the different explosives now used in blasting in mines, and in the report of the discussion on mining explosives at the late meeting at Camborne of the members of the Mining Institute of Cornwall. I do not propose to notice the very elaborate and "unmistakeable puff" of Tonite by your correspondent "Miner," further than to say I agree with your correspondent "Powder" that his statements are calculated to mislead, and, in my opinion, more so even than the circular of the agent of the company which was so severely censured by the jury on the inquest after the West Basset accident. I have never yet been able to ascertain how the accident, which took place very shortly before those at West Basset, in driving the tunnel on the railway between Bettws-y-Coed and Festiniog is to be accounted for. The evidence in that case was clear and simple. A miner was charging a blast-hole with tonite, and using a wooden rammer for the purpose, and without any warning the charge exploded, and sent the rammer through the body of a workman who was standing behind, and killed him. It appeared that every care was taken. The hole had not been fired before, and it must be presumed that the wooden rammer did not emit a spark. What, then, occasioned the explosion? The engineer of the line was applied to for information, but he could offer no solution. We must suppose that some of those who descant so loudly on the wonderful safety of tonite can do so, and, if they would, they might put those who use it on their guard against similar accidents.

But the chief object I have in addressing you is not to expose the fallacies of those who contend that either tonite or any other explosive can be considered absolutely safe to use or play with. The mere term "explosive" ought to be sufficient to caution every person who knows its meaning that care should be used in dealing with every article falling under that definition, since it must be presumed explosives are manufactured with the intention that they should explode, and they may, perhaps, do so sometimes most unexpectedly. Passing by the relative merits of the known explosives now in use, and believing as I do that each has its advantages and demerits, and assuming that every practical man will use what best serves his purpose, I desire to draw the attention of your readers engaged in mining pursuits, and more particularly those whose pecuniary interests are involved, to a question of the greatest practical importance. Complaints are made, and not without reason, of the high price of explosives generally, and more especially of the powerful explosives of modern invention, such as dynamite, guncotton, &c., and although it has been clearly demonstrated that for many purposes these explosives, even at their present prices, are cheaper than gunpowder, effecting as they do a saving in time, labour, and expenditure in obtaining the same result, yet it is known that the cost price of the ingredients used in the manufacture bears no reasonable proportion to the price charged for the article, and it is, consequently, supposed and argued that the profits are excessive. Now, is this so? And if not, why not? And can anything be done to remove the cause?

The cost of Dynamite was more particularly referred to by Mr. Teague, jun., and others at the meeting at Camborne, and I will, therefore, deal with it, premising that my observations are equally applicable to guncotton and other explosives. The difficulties which the manufacturers have to encounter, and the obstacles thrown in their way by recent legislation, can scarcely be conceived—they border very closely on prohibition. The British Dynamite Company were obliged to purchase a large quantity of land in Scotland, and to erect their manufactory and stores in numerous detached buildings, at great cost, to meet the requirements of the Government Inspector. Having done so, they could not move a step without a Government licence, and except under Government restrictions of every conceivable kind, extending even to the age, sex, number, and clothing of the workpeople employed in every separate building, the mixing of the ingredients used, and the storing and transport of the material, with notices and technical difficulties, and penalties at every turn, and what is worse than all, the railway companies taking advantage of the doubtful wording of a clause in the Explosive Act, now refuse to carry any of the more powerful explosives, such as guncotton, dynamite, lithofracteur, &c., under any circumstances, or at any rate whatever. In consequence of this the British Dynamite Company have been obliged to employ a steam vessel as the only available means of delivering their dynamite on the sea board, and to cart it from thence to their inland stores at great additional cost and inconvenience. Even in their transport by sea they have to encounter another difficulty. Harbour authorities are by the Explosives Act required to make bye laws to control the anchorage, loading, and unloading of any vessels containing explosives which shall enter their harbours, and some of these authorities seem to think that the easiest mode of doing this is absolutely to prohibit any such vessel from entering the harbour, or loading or unloading, explosive compounds within the bounds of their jurisdiction. In all such cases, and I am sorry to say they are numerous, and unless public opinion shall be brought to bear will no doubt increase, the cargo has to be landed at the nearest available port or landing place, although it may be a most difficult and dangerous one, and to be carried increased and often very considerable distances by land in carts or vans subject to the Government regulations. When it is considered that the steam vessels so employed have to make voyages all round the coast, and at all seasons of the year, frequently being detained by stress of weather, and often with very limited cargoes on board, with detention at every port they enter, for the giving of the necessary notices, and complying with the forms required under the provisions of the Explosives Act, and by the Custom House authorities, it will at once be seen that the manufacturers are subjected to very excessive, vexatious, and unnecessary expenses, the whole of which must eventually come against the consumer.

As I am not in the secrets of the manufacturers I have not the means of knowing what the profits of the trade may be. Some provision has, no doubt, to be made to meet such accidents as the one at Stowmarket, and those which so frequently occur at all the gunpowder manufactories, and it may be that the profits are large, but whatever they are it is evident that large provision has to be made to cover the expenses of transport above referred to, and that the price of the article is thereby greatly increased, probably to the extent of one-fourth. I desire, therefore, strongly to urge some united action to try and induce—I would even say to compel—railway managers to relieve the mining interest of this extra cost by consenting to carry explosives, if even at high and well paying rates. It seems to me to be childish to sit down and complain of a grievance and to make no effort to get rid of it. I believe that the manufacturers have been indefatigible, and have used every exertion in their power to overcome the prejudices of the railway managers, but without avail. Railway managers are, however, after all public servants, and must in the end bow to public opinion, and it is for the mining interest at large to take up the question, and by public meetings, petitions to Parliament, and calling in aid the assistance of their representatives in the House of Commons, to overcome the difficulty. The railway companies are ready enough to receive freight for the carriage of ore won by the use of explosives, although they throw every impediment in the way of the owners of mines in obtaining such explosives. They have, indeed, obtained a complete monopoly of the carrying trade throughout the country, and they now repudiate and avoid the old and well-known duties and responsibilities of common carriers, by refusing to carry particular goods and merchandise when required to do so. Then, again, harbour authorities are appointed to manage and improve harbours for the protection and convenience of shipping, and the promotion of commerce, and not to close them against vessels carrying commodities of the greatest public utility, and absolutely necessary for the promotion of the industries and commerce of certain localities.

London, Feb. 10. A PRACTICAL MAN.

P.S.—Since writing the above I have seen the letter of "A Reader" in this day's Journal, and am glad to find that he coincides with my views. I observe that he quotes Dr. Le Neve Foster's uncalled for attack on Mr. Nobel, and exposes the inaccuracy of his reference to his *son*, who never had any existence. I presume that Dr. Le Neve Foster intended to refer to the lamentable accident which occurred some years since at Stockholm to Mr. Nobel's younger brother, a clever chemist and talented and promising young man, and by whose death the scientific world sustained a serious loss. He was killed by an explosion which took place while making some experiments with nitric and sulphuric acids and tallow, and not by an explosion of nitroglycerine, as stated by Dr. Le Neve Foster. The subject appears to be scarcely fitting for a meaningless joke.

ORGANISATION OF THE MINING INTEREST.

SIR,—I quite agree with the letter of your correspondent, "A Reader," in last week's Journal, that in order to reduce the price of explosives consumers should form a compact organisation; but I would go much further than he does, and suggest that such an organisation should have for its object the consideration of all questions affecting mines and their working. A powerful combination, with a good executive committee to take into consideration existing and proposed Acts of Parliament, Railway and Harbour Bye-laws, &c., and to bring such matters under the notice of the leading mineowners, could do much good. If, Sir, you will take charge of letters addressed to me on the subject I shall be pleased to receive communications and suggestions from gentlemen who would be disposed to aid in the formation of such an organisation.

ANOTHER READER.

OUTLINES OF GEOLOGY—No. III.

THE OLD RED SANDSTONE AND CARBONIFEROUS SYSTEMS.

SIR,—The Old Red Sandstone formation is of 12,000 ft. or more in thickness, being found in England and Scotland, as well as in Central Europe, Russia, Siberia, the Himmalayas, Central Africa, and in North and South America. The system is largely developed in the South of England and Scotland, and its extensive development in other parts of the world gives an idea of the areas of sea and land during the period. The system is divided into lower, middle, and upper; they seem to imply considerable movement in the earth's crust, causing changes in the sea and land areas, giving rise to different strata and to fossils of a different character. The Devonian rocks, like the Old Red Sandstone series of rocks, occur between the Silurian and the carboniferous periods, and for this reason the Devonian and Old Red Sandstone rocks are considered to be contemporaneous, though the former—largely developed in Devon—consist of clay-slates, limestones, and brown sandstones, whilst the latter—found in Hereford, Wales, and Scotland, consist of red sandstones impregnated with iron and conglomerates. They are different rocks lithologically, but may have been laid down under different conditions, and the material of which they are formed derived from different sources.

Vertebrate animals are now found almost first in the Old Red Sandstone system, though a few relics of fish are found in the Upper Silurian. The peculiar fishes found in the Old Red are cophalaspis, cocosteus, pterichthys, &c. These fishes are principally found in the yellow sandstone and flagstone series—not in the highly coloured sandstones. Neither are the corals, crustacea, or shell fish of the Silurian period found in the red-coloured rocks, showing that the metallic impregnation in these rocks must have been deleterious to animal life The Old Red formation yields Caithness flags, so much used for paving, also poor mineral veins of galena and baryta. The plants of this period are few, consisting of seaweed, club moss, and ferns. Thin seams of coal are found in Canada, which point to extensive land vegetation. The animal life consists of corals, encrinites, star fish, and shells from the Devonian limestones. These are not found at all in the red rocks of Hereford. Of the fishes before alluded to some annelids and large crustaceans are found generally throughout the series, excluding the red rocks. The Old Red Sandstone formation is frequently intersected by dykes of igneous matter (basalt), but is rarely interstratified with it. This indicates that volcanic action was quiescent in this period.

CARBONIFEROUS SYSTEM.—It has already been mentioned that coal is the result of the growth of vegetation, consolidated in the form of peat, becoming by means of heat and pressure successively lignite and true coal. Anthracite or graphite is found in the Silurian formation in Ireland and Isle of Man. Coal is fonnd in the Devonian formation in Canada in small seams. True coal measures are found in England, Wales, Scotland, France, Belgium, Prussia, Spain, China, India, Australia, Nova Scotia, and the United States of America, including the anthracite of Pennsylvania. Coal is also found in the millstone grit of Northumberland, and in the mountain limestone in Scotland and Russia. Coal is found in the oolitic formation, is worked in the neighbourhood of Danby in Yorkshire, at Brora in Scotland, in South Hungary, and in Pennsylvania; there is also Kimmeridge coal. In the Wealden system lignite is worked in North Germany. In the cretaceous formation coal and lignite are obtained in the Alps, Moravia, and South America. Lignite is obtained from the eocene tertiary, in the Tyrol and the Alps, from the miocene in Germany, the Alps, in Mull, Antrim, Vancouver Island, and Bovey in Devon. Lastly, there are vast beds of peat in Ireland, and some in Britain, Holland, North America, Canada, North Europe, Siberia, &c. The coal measures vary in thickness from 1200 ft. in South Staffordshire, 5000 ft. in North Staffordshire, to 12,000 ft. in South Wales, and to 20,000 ft. in Saarbrucken. The coal measures of Northumberland and Durham are little more than 2000 ft. in thickness. Coal has evidently been in use from the earliest historic times; the Chinese have long been in the habit of using it. The Egyptians and East Indians do not appear to have made any use of coal, always to have employed charcoal in their smelting operations. The Greeks and Romans used coal in a very limited way; ancient coal workings are still extant, ascribed to the period of the Roman occupation of Britain, wherein stone hammers and other instruments have been found. The working of coal, in fact, was almost *nil*, or on a very limited rate over the whole world up to the 12th century, when the trade in Newcastle coal received an impetus from the growth of large towns, such as London, Newcastle, &c., the exhaustion of woods and forests requiring some new fuel to make up the supply. It was not until a later period (the end of the 17th century) that coal was used for smelting iron and other metallurgical purposes, so that the supply of coal in the 12th century and some time after must have been applied for house purposes.

The mountain limestone, the lowest member of the carboniferous formation, has a thickness of from 500 to 1500 ft.; it constitutes the range of hills extending from the Cheviots into Derbyshire, the summits of which are often 2000 ft. above the sea level; this range is the Pennine chain of England. It is a pure hard, often crystalline, limestone, with a few beds of shale occurring in it and above it. Upon this lies the millstone grit, about 400 ft. in thickness. The Pennine chain forms an anticlinal axis, having apparently been forced up and divided the English coal field, the division on the west forming the coal fields of Lancashire, Cheshire, and Staffordshire, that on the east the coal field extending from north of Leeds into Nottingham. It is possible that the Pennine chain may have been upheaved prior to the laying down of the coal measures, in which case the coal strata would be deposited against its slopes on either side. The area occupied by the South Staffordshire coal field must have been elevated Silurian ground during the whole of the Old Red Sandstone and mountain limestone periods, as the coal measures there rest on the Silurian formation. The areas of sea and land may be partly defined in the carboniferous periods by the number of coal fields already named in various parts of the world, these being probably a small part of the complete coal formation before it was reduced by volcanic upheaval and denudation to its present area and position. The fact that coal measures have been deposited in all quarters of the world at this period apparently contemporaneously points to an atmosphere and climate peculiarly suited to the growth of vegetation on the earth, which have not been bestowed on any subsequent age, as represented by a geological formation, except in a limited degree. What has become of the materials carried away by denudation from the coal fields? They are not discerned as existing in any of the subsequent formations, either as coal or carboniferous shale; they may, however, have been carried to areas which still exist as seas, and there hidden from observation. The fossils of the mountain limestone are marine. Of the encrinites many genera are found, their remains constituting the principal component of many beds of limestone, corals of new forms, brachiopods, as producta, spirifera, &c., gasteropods as ammonities, orthoceras, &c., crustacea chiefly the trilobite order, and fishes of the ganoid order, are found in great numbers. Many of the fishes are of great size, as megalichthys, and have been termed sauroid fishes, as more resembling reptiles than fishes. The plant remains of the coal measures are found chiefly in the shales overlying coal seams, principally fragments of equisetums, ferns, club mosses, lepidodendron, sigillaria, or pine-like trees, and stigmaria, the roots of the same, found in the under clay of many coal seams.

Besides coal the carboniferous system furnishes lead and silver from veins in the mountain limestone, as in Weardale, Derbyshire, and North Wales. The right-running or principal veins run nearly east and west. These are intersected by later formal veins running at right angles and by quarter veins. The lower coal measures yield ironstone of good quality in bands and bails, as in South Wales, Yorkshire, and Scotland. Many sandstones are found in the coal measures, and extensively used for building purposes on account of their durability and fine tints of the stones they yield. The fireclays now rank as one of the most valuable products of the coal measures, the bricks made from them being now so largely used for building purposes in place of sandstone, and for ironworks and other furnaces where great heat is generated.

The coal measures are interstratified with greenstone or whinstone. This was probably caused by contemporaneous eruptions of lava under water. The coal measures have subsequently at the end of the period been subjected to extraordinary volcanic disturbances, as shown by dykes of intrusive lava, and by the numerous faults and dislocations of the strata, the largest fault in the Northumbrian coal field dislocating to the extent of about 250 yards. Others in the Lancashire coal field dislocate to the extent of 500 yards or more. The deposition of the coal measures has thus been followed by a period of great volcanic activity and consequent disturbances in the earth's crust, as the British, Belgian, and other coal fields abundantly show.

After this period of volcanic activity a new era commences, in which the members of the Permian system were deposited, these being the Lower Red Sandstone upon this marl-slate, then magnesian limestone, and red and variegated marls upon these. The marl-slate is productive of the remains of fish; the genus palæoniscus occurs here for the last time. But few beds of the magnesian limestone are fossiliferous, the organisms being principally brachispods, as rhynchonella, terebratula, &c. The primary or palæzoic period closes with the Permian formation, after which the secondary period commences with its own peculiar forms of life, differing in a great degree from the animal and plant remains described as living in the primary period.—*Feb.* 13. M. B. G.

SCIENCE IN ITS APPLICATION TO MINING.

SIR,—I beg to be excused for showing Mr. Knapp, of the Llanrwst Lead Mines, that a little learning is a dangerous thing, and that he is unqualified to write on practical and scientific subjects bearing on mining. It did not then occur to me that a few months ago Mr. Knapp, with a flourish of trumpets, announced to the public through the *Mining Journal* that he was about to erect dressing machinery at Llanrwst, that he had a particular dislike for anything crude or defective, and that he was about to visit Aberystwith for the purpose of making an examination of some machinery operating there, and of ascertaining with his microscope the exactness of the classification of their ores. Practical men will, doubtless, be charmed with such a nice little instrument as a microscope in conducting dressing operations in mines. Who can question its invaluable utility in the construction of classifiers and the subsequent examination of the stuff classified? I back Mr. Knapp for folly with his blow-pipe and microscope (and I was near forgetting the kid gloves) against any mine agent in the United Kingdom. It must be remembered he hails from Llanrwst, and looks down upon anyone living in such an obscure country as Portugal, or elsewhere, and well he might, as the blow-pipe and microscope are invincible mining tools in the hands of such an adept, and are fairly typical of Mr. Knapp's Lilliputian knowledge and understanding. Alas, that such hopelessly ignorant and egotistical people as the hero of the microscope are permitted to disfigure the fair face of Nature, and how woefully gullible are mining companies and directors when men can fog them with a few big words compiled from dictionaries and other books, dilate on the efficacy of the microscope and blow-pipe, and call that mining. One word more, and I have done. Mr. Knapp cannot find a loophole for escape. I have hemmed him in. Facts are stubborn things. I have beaten him on his own ground—a very simple and easy matter to perform, as he wrote on a subject he had little understanding in, and as a subterfuge he now resorts to abuse. It is plain from the coarse invective he indulges in that he measures others by his own defective capacity. I have no malice, hatred, or ill will for Mr. Knapp, as I possibly could not, having, to my knowledge, never seen the man, but, as a tree is known by its fruit, I deemed it a duty to deal him a gentle reprimand which every understanding man will agree he richly deserves for poking in his sophistry when some able remarks were being made through your valuable Journal on the

qualifications of mine agents. I apologise for thus far trespassing on your space, and I promise to allow this subject to drop here so far as replying any further to abusive writing or any other remarks ignorance may suggest to the author of microscopic ore dressing. The above is my reply to Mr. Knapp's letter of Jan. 30, published in the Supplement to the *Mining Journal* of the 3rd inst.

JUSTITIA,
Portugal, Feb. 10. The Author of Microscopic Ore Dressing.

THE RICHMOND MINING COMPANY.

SIR,—I cannot concur with the view taken by "A Shareholder," whose letter appears in the Journal of Feb. 3, when he says "they (the directors) are doing wisely in withholding the dividend due next month." On the contrary, no step the directors could take, in my judgment, is more likely to shake the confidence of the public as well as the shareholders in the stability of the mine than that of suspending the dividend at the present moment, particularly in the strong financial position now occupied by the company. Let us briefly examine what that position is by the light of the deputy-chairman's statement at the last general meeting. We had, Mr. Hopkins tells us, on Sept. 1 a balance at our credit of 28,024*l.*, and according to the published weekly returns between that date and Nov. 30 we have taken out of the mine ore of the estimated value of 131,200*l.*; so that at the close of November we had standing at our credit 159,224*l.* From this the following deductions would have to be made:—

1.—The dividend paid in November	£20,249	0	0
2.—Expenses at the mine, at £1000 per day	75,000	0	0
3.—London expenses,* includg. debenture interest	1,617	0	0
4.—Estimated quarterly expenditure on capital account, calculated on the average annual expenditure (15,634*l.*) of the past five years	3,908	10	0
	£100,774	10	0
Estimated credit balance on Nov. 30, 1876	58,449	10	0
Total	£159,224	0	0

* Estimated on the basis of last year's expenditure.

According to the above calculation, and which I believe to be approximately correct, we must have had, therefore, a sum of about 58,450*l.* standing at the credit of revenue on Nov. 30 last; and such being the case, there seems no reasonable ground for withholding the present quarterly dividend simply out of fear of the consequences of such a preposterous claim as that just set up by the Eureka and K. K. Companies. A COUNTRY SHAREHOLDER.
Tenby, Feb. 8.

RICHMOND MINING COMPANY.

SIR,—In illustration of my contention that the directors of the Richmond Mine—unintentionally may, perhaps, be admitted—enable the "bears" to act upon the shares of this company by their policy of concealment, I will just refer to the circular issued by them soon after the attack of Mr. McHenry, in the autumn of last year, wherein they state that the time of the attack could not have been more badly chosen, inasmuch as just before the attack the profits in a single month (that of August) had been more than 20,000*l.* Now, if the directors had, as I contend is their duty, issued periodical reports at intervals of not less than a month at least, as to the condition of the mine, that attack would not have been made, and further proves what I state, that they are to a considerable extent accessories to these attacks. Now, I think no one will deny that there is no class of investment so much as mines that requires an honest and conscientious directorate, nor any class so open to the machinations of a dishonest one. A mine is literally shut out from the light of day, and any change in its condition may be concealed, as long as it suits the purposes of a jobbing board. Let me here state that I am not now accusing the Richmond board—they may be the most honest of directors, or they may be the reverse; they may be the wisest, or they may be the most foolish; but on these points I wish it to be understood that I offer no opinion. This, however, I must say, that whatever the motive a policy of concealment naturally gives rise to suspicion, and in the end produces an utter want of confidence in those who practice it.

I will now refer to an incident which occurred at a meeting some time since on the subject of the loan from Mr. Meyer, the bullion agent to the company. It appeared to be rather generally understood, from the Chairman's speech, that the company was out of debt; but some shareholders in the course of the meeting appeared to dispute this, when a shareholder got up and stated that he understood the company was entirely out of debt, and asked if that was so. The Chairman replied that the company was quite out of debt; but some time after this meeting it became publicly known that the company had a loan of considerably more than 100,000*l.* from Mr. Meyer, and the explanation which the Chairman gave at a subsequent meeting was certainly wonderfully elever and original, if not very logical. It was this—that as they had a certain amount of bullion in the hands of the agent, some 15,000*l.* or 20,000*l.*, if I recollect rightly, a certain amount of ore on the dumps, and a certain amount of stores on hand—I do not know whether they had been paid for—which, together with certain other things, he estimated to be equal to the amount of the loan, therefore he considered that the company was out of debt. This was a discovery approaching in value to the "philosopher's stone," and one which I commend to the notice of Chili and Peru, and other states of that order. This explanation certainly appeared to my simple mind as if the dividends for some time had been paid out of borrowed capital, but this I will leave to wiser heads to define. It did not, however, very greatly increase my confidence, whatever effect it might have had on other shareholders, who might have looked at the matter in a somewhat different light. COMMON SENSE.

CARDIGANSHIRE MINES, A.D. 1877—No. III.

SIR,—As promised in my last, I will commence by giving you a few remarks on the EAGLE BROOK MINE, where about two years since, by driving the bottom level eastward, they tapped a stream of water that overpowered their machinery. At this point the lode was of great size and promise, yielding as far as could be seen of it excellent lead ore, and, were they in possession of machinery powerful enough to cope with the water, I have no doubt they would have opened out a good course of ore, and have laid open a good mine, as they were here out of the influence of the elvan, where so many thousands of pounds were expended at a loss. They are now engaged in driving a shallow adit east in the hill, eastward of their discovery, and leading towards Cam-dwr Bach Mine (of which I shall next have to write), but this adit, although in good killas ground, is too shallow for making important discoveries.

CAM-DWR BACH MINE.—The Eagle Brook lode forms a junction with another vein coming in from the south at the mouth of the adit level, which is extended on their course for about 15 fms., where the main, or Eagle Brook, lode turns to the north, and on this lode the adit has been extended a distance of 90 fms. In this distance the lode has been partially cut through in three different places, showing a good course of blende spotted with lead ore for 70 fms. long. The best and richest lode now stands in the present forebreast, and which has a back or cover of from 40 to 50 fms., and by driving 40 fms. further east a back of 80 fms. will be obtained, and this will continue for 600 fms. in length, without any depression or fall of ground at surface, so that the greatest blende mine ever yet laid open in Cardiganshire will undoubtedly be laid open here when this work shall have been accomplished. All that is now required to do this is to erect a good water-wheel for crushing and dressing, with the necessary dressing machinery, and 500*l.* for buildings, rails, and other purposes, and for which a large portion of the mine would be handed over to any party willing to join. To anyone who may really feel inclined to take a part reports, plans, and sections, and every information, will be most readily forthcoming on application to the writer.

DROSCOL is a mine started since 1874, and stands to the south-east of the Cam-dwr Bach Mine. It has only been opened on near the surface, where the vein is large and strong, and producing good stones of manganese—a mineral not often met with in this county. Deeper explorations must be made before any decided opinion can be formed of its merits.

HAFAN AND HENFWLCH MINES stand to the south of Cam-dwr Bach Mine, and very large quantities of ore have been extracted. In driving a long adit on the Hafan, or western side of the mountain, after reaching Sheldon's old workings a cross-cut was put out under them, so as to reach the western point of them. This was accomplished, and the lode seen, but never driven on. It is only to drive eastward at this point to lay open a rich course of lead ore, and which above was sufficiently rich to have made an ample fortune for the then worker, Mr. Sheldon, whom I well remember, and who got all his money by working it without the aid of any machinery beyond an ordinary hand tackle and bucking hammers. A blinder job, or a greater blunder, than to leave this trial untouched never came under my notice, and the parties to whom it belongs should not be allowed to play the dog in the manger game any longer, but should be compelled by Sir Pryse Pryse either to work or abandon it, which there are a plenty of parties ready and willing to do. In my next I intend offering a few remarks on the Bwlch Hellyn Mine, and some others.—*Goginan, Feb.* 13. ABSALOM FRANCIS.

ROSE UNITED MINES.

SIR,—North Downs Mine, in Redruth, and Wheal Rose, in St. Agnes, are contiguous (old) mines, lastly resumed by one company under the name of Rose United Mines, manager, Capt. George Tremayne, but for want of capital little was done, except the erection of a pumping-engine and a winding-engine on Wheal Rose part. The pumping-engine was worked a few months under great disadvantages, having the water from North Downs and Halenbeagle Mines coming to it—"a sea of water," as miners say; so that to continue to work that engine alone would be folly, and capital not being forthcoming for additional machinery, the engine was stopped, and all operations, of course, ceased. A few years before the last company was formed Wheal Rose was worked separately, by the late Messrs. Sampson, Waters, and Company, at one time with good prospects, but it ultimately became a losing concern. About 70 years previously, under an old company, it is said to have yielded large profits. Simultaneously with Wheal Rose, North Downs—also an old mine, which had yielded large profits to Messrs. Williams and Co.—was worked under the management of Capt. J. Vivian, and it is for the purpose of recording in the Journal the result of that working that I trouble you with the subjoined details. The *Mining Journal* I look upon as a repository of mining facts—a current history of mining—and the insertion of the following items may rescue them from oblivion, to which they might otherwise be consigned by the effluxion of time.

The following is a return of the copper, tinstuff, &c., sold during the last working, under the name of Great North Downs:—

Date.	Copper ore.			Tinstone.		
1863—June	£ 500 12 1			£ 251 8 1		
August 27	343 15 4			—		
October 29	425 0 1			72 2 9		
December 3	—	= £ 1,269 7 6		128 13 4	= £ 452 4 2	
1864—February 25, &c.	1263 19 1			—		
January 28	—			184 19 5		
March 31	—			88 9 9		
April 28	657 6 3			—		
June 30	716 18 5			110 6 9		
July 29	—			44 18 7		
July and August	787 12 11			—		
Sept. and Oct.	703 8 8			237 12 1		
Nov. and Dec.	946 7 2	= 5,075 12 6		—	= 666 6 7	
1865—Jan. and Feb.	759 2 0			—		
February 7	—			89 0 9		
April 3	—			98 2 0		
,, 29	703 14 10			—		
June 6	—			151 19 3		
,, 29	857 4 11			—		
August 22	—			69 17 7		
,, 24	984 14 1			—		
October 24	1061 12 3			—		
,, 25	—			139 7 6		
December 29	—			106 8 9		
,, 28	668 2 0	= 5,034 10 1		—	= 654 15 10	
1866—March 1	586 12 2			—		
February 26	—			147 8 6		
April 30	655 7 4			178 17 11		
—	—			150 18 0		
August 30	376 2 6			—		
October 25	571 12 6			—		
December 27	270 5 0	= 2,459 19 6		94 15 1	= 571 19 6	
1867—Sundry sales	2839 16 6			723 10 4		
ditto	2510 10 1			—		
Sept., Oct., Nov.	5125 19 3			724 19 9	= 2198 8 7	
—	—	= 10,476 5 10		516 9 0		
1868—Sundry sales	4492 3 0			705 8 0		
Aug. and Oct.	3889 18 8			—	= 1221 17 0	
December 24	1780 1 7	= 10,162 3 3		—		
1869—February 25	1136 11 1			—		
March 10	—			844 9 5		
April 29	791 3 11			—		
June 24	250 19 2			—		
May 15	—			203 7 6		
July 8	—			331 13 0		
September 9	—	= 2,178 14 2		367 18 6	= 1747 8 5	
1870—January 6	—			207 1 0		
February 22	—			274 0 9		
,, 24	698 8 11	= 698 8 11		—	= 481 1 9	
Total		£37,355 1 9			£7994 1 10	
Tinstone (brought over)		7,994 1 10				
Red ochre		9 10 0				
Mundic		5 0 0				
Total returns		£45,363 13 7				

Truro, Feb. 14. R. SYMONS.

LOW-PRICED MINING SHARES.

SIR,—There are probably few securities that will so well repay the capitalist, large or small, as locking up for a time some shares in those Cornish mines which can now be obtained at such low prices—in some much below the value of the plant. Many securities offer the "chance" of a large increase in value in the course of a few years—as, for instance, those foreign stocks on which the interest is not at present paid. But this prospect is vague, and depends upon several uncertain conditions; so much so that these stocks have very much the character of lottery tickets, in which large profits may possibly be made, though the chances are greatly against such a result—with those mining shares which are quoted at such depressed prices the case is different. That at some time these stocks will be worth a great deal more, no one acquainted with them can for a moment doubt. In some cases where prices are very low perhaps fifty times or more than what they command at present is not only probable but certain. The only question is how long will it be before the rise will take place? And even the question of time is in many cases not so uncertain as it may seem—that is to say, the interval will probably be much shorter than some may suppose.

The grounds on which I form so confident an opinion are experiences of the past, and the wonderful changes Cornish mines have exhibited in making profits, and overcoming what have appeared at times insurmountable difficulties. This has been the case not in one or two instances only, but in many, and when the recovery from depression has taken place it has been rapid, and in many unexpected. The experience learnt in the past cannot fail to lead to the recovery of many of the mines still under a cloud, and when once the recovery has fairly commenced the advance to prosperity may possibly be even more rapid than similar movements have been in days gone by. The mines now quoted in the market much below their real worth are—Agar, Carn Brea, Cook's Kitchen, Cathedral, South Carn Brea, South Condurrow, Dolcoath, West Frances, Wheal Grenville, Wheal Kitty, Penstruthal, East Pool, West Seton, Tincroft, Wheal Uny, Penballs, and Providence. I venture to assert that there is no reason why, sooner or later, all these mines should not be quoted at prices very much beyond those at which they now range. Some of the croakers say that the position of more than one of them is far from good, and apparently hopeless, on account of the water they have had to contend with of late; to such I reply an obstacle of this kind is thought very little of by Cornish miners, and a week or two will be sufficient to remedy this.

About the year 1848 Cornish mining was in a more deplorable condition than it is now. Miners were on the verge of starvation, and many were driven to desperate deeds, so far, in fact, that the military had to be sent for from Falmouth and Plymouth to protect property in and around Redruth. It was then thought and openly announced that Cornwall was done for as a mining county. Property generally was greatly depreciated in value, and many sacrifices had to be made. Bargains were picked up by those who had courage and money at command that would scarcely be credited by those unacquainted with that period. I well remember that about this time there was a sale by auction at Hayle of some Alfred Consols, and the shares were knocked down at 30s. each, when in less than 12 months a demand set in for them, and 100*l.* per share was freely offered, and profits from sales of ore soon after were divided amounting to nearly 90,000*l.* Basset shares rose from 40*l.* each to 1200*l.*, and in a few years gave 325,000*l.* profit. Buller from 5*l.*, on discoveries made, rapidly advanced to 1500*l.*, and the dividends were close upon 600,000*l.* South Frances, East Basset, South Tolgus, North Basset, North Pool, and West Basset. All these properties paid well, and at one time commanded high prices on the market. I could enumerate many more prizes, but think I have demonstrated sufficiently the value of Cornish mining shares as a medium either for investment or speculation. And now, Sir, fearing I have encroached too far on your valuable space, I repeat, in conclusion, that for shares to be locked up for awhile nothing is so certain to prove remunerative as a selection from the present low-priced Cornish shares, and the time that will elapse before some of these reach a high figure will perhaps be much shorter than at present appears possible.

Crown Chambers, Threadneedle-street, Feb. 15. JOHN R. PIKE.

MINING GRANTS.

SIR,—In times of mining depression like the present it would be well for the lords to consider in what respect they can promote mining, so as to have the mineral resources of their land developed instead of being "locked up." I will briefly state what I think they should do.—1. They should require no royalty except out of profits.—2. They should charge for land destroyed or damaged such amount only as should be declared by a disinterested valuer a fair price for the same, instead of the present unfair charge of 100*l.* per acre.—3. The sum paid for the land destroyed or damaged should be reimbursed to the miner out of the dues paid to the lord.—4. All buildings erected by the miner should be his property for a term of years like that granted in building leases; and 5. The charge for conveyancing should be reduced 50 per cent. R. S.
Feb. 14.

NEW CONSOLS SILVER WORKS.

SIR,—"A Resident near the Works" need not on calm reflection wonder much at the low price of shares in this mine when it is remembered that the same glowing description of inexhaustible resources and forthcoming immense returns, as he himself gives, has been constantly appearing in print for years and years past. At first the discoveries of tin were said to be something amazing. Now the scene is changed to silver, and other products of an equally startling nature. This, with the 100,000 tons of mineral in a mine near the New Consols, which it was said only required quarrying away, and the mountain of tin represented as cast away by old miners in another neighbouring enterprise, so forcibly noticed by Capt. Gregory in the *Mining Journal* a fortnight since, sufficiently accounts for the want of confidence in many of the inflated mines of this greatly imposed upon mining district.
Feb. 14. ANOTHER RESIDENT NEAR THE WORKS.

PENSTRUTHALS AND CATHEDRALS.

SIR,—I and others were in hopes that your well-read Journal would have continued having some more particulars respecting the Penstruthal Consols Tin and Copper Mine, and trust that your columns are not closed to this interesting company, believing that there is a very great future for the holders of shares in the above concern. It still appears inconceivable why the shares remain at so low an ebb, and fancying that the public must know more than individuals, I am sure you will be conferring a wide favour by giving independent remarks upon the investment, or by permitting others to do so in the shape of correspondence. I have been strongly advised not to allow this great opportunity to slip, but being of a rather cautious nature I prefer some outside information, and should feel grateful for such from a reliable source. I may add that Cathedrals appear to be as well spoken of, but I am equally in the dark with this mine. A CONTEMPLATING INVESTOR.

WEST MARIA AND FORTESCUE.

SIR,—Some time has elapsed since much was heard about West Maria and Fortescue, a mine upon which the present company has expended 50,000*l.* (without estimating the results of the sales of produce, which must have amounted to a very large sum), but as I see matters are improving there we shall doubtless soon hear of it on the market, and it would be interesting to those generally concerned in English copper mines to know how the persevering managers are progressing with certain experiments. It is now over a year since a heavy call was made for, as I understood, the purchasing of a boring machine for the purpose of arriving more quickly at the depth at which so much is (not without excellent reason) expected, but nothing is mentioned in the *Mining Journal* reports about the progress with the machine. As a desire to expedite matters was the main object in agreeing to purchase the machine, how is it that over a twelvemonth has passed and we do not see any account in the Journal as to whether the machine was purchased and fitted, whether it is working, or who is the maker? For my own part, as one concerned in a copper mine in the neighbourhood, which has proved a success after a similar depressing career, I heartily concurred in the policy which led to the step, and I feel sure that it will be of interest to many readers of the Journal if some one will inform us whether the machine is working, who is the patentee, and whether it has been found useful; believing that the information will be acceptable at a time when the utmost exertion should be made to arrive at the wealth that cannot be very far off in this property, which has been known in the market on and off for so many years.—*Feb.* 8. WILLIAM PENRUDD.

WHEAL GRENVILLE MINE.

SIR,—Allow me through the columns of your valuable Journal to communicate my ideas on the future policy to be observed in conducting this mine. First, we start the next three months with assets equal to our liabilities; secondly, the water is out of the mine to the 130, and the men have resumed their work; probably by the day of the meeting the men will be all at work in the 140, when our weekly returns of tin will be coming forward as usual. Having got over this difficulty of water for probably 10 months to come, my opinion is that unless a good second-hand engine can be had at half the price of new, have a new one delivered free on the mine. In the meantime the engine-house can be proceeded with. Granite is near at hand, and can be had for cutting. The house for the engine can be built and ready for use by Sept. 1. The engine can be put in and at work before Christmas. If we estimate the cost of a strong and substantial house at 650*l.*, only one-half of this will be required before the end of May; the other half at the general meeting in May. At the quarterly meeting at the end of August a call of 3*s.* 6*d.* would provide the first moiety in payment for the engine. A similar call would be required in November to discharge the remaining half. A call of 3*s.* 6*d.* at the coming meeting and succeeding meetings, until the engine and pitwork are in their places seems to me all we require. We shall at the end of that time have a 60-in. engine and a quantity of pitwork for sale, which we may reasonably suppose will sell for sufficient to provide us with extra stamping force and the laying out of tin floors, which we shall require. There is also an asset which will become valuable as the mine is energetically developed, and will probably more than pay for the engine before Jan. 1, 1877—I mean the 850 forfeited shares, which, at the low price of 2*l.* 10*s.* each, will yield 2125*l.* If ever our Grenville shares were worth buying and holding, surely that time must be now, seeing the loss on the last three months has only been 2*s.* per share, and that at a time the most disastrous in Cornish mining.

If predictions were not sometimes falsified I should say that such

will be the reaction in value of engines, pumps, and spare materials, by the time we want to sell out, that we should make a good profit on the difference. As a shareholder who has recently doubled his interest I rejoice at the wise resolution decided upon at the last meeting. I verily believe the engine will save its cost in coal in three years time, especially if a new engine be secured. Should business engagements admit of my attending the Grenville meeting on the 22nd inst., I shall with pleasure hold up my hand in support of the vigorous management now initiated. SHAREHOLDER.

[For remainder of Original Correspondence, see to-day's Journa..]

Meetings of Public Companies.

BLUE TENT CONSOLIDATED MINING COMPANY.

A general meeting of shareholders was held at the offices, 14A Austinfriars, on Tuesday,

Mr. J. IRVING COURTENAY (the chairman) presiding.

Mr. W. J. LAVINGTON (the secretary) read the notice calling the meeting.

The following is the report of the directors:—

The directors beg herewith to submit the annual report and balance sheet for the year 1876. The report of the general manager—Mr. Thomas Price—gives full details of the difficulties he had to contend against, both at the mines and on the canal, during the past year, and, with the aid of the appended map, it is hoped that the shareholders will be better able to realise the extent of their property, and to follow the future developments as reported from time to time. Each block on the map represents 2 acres. Owing mainly to the unusual severity of the winter and spring of 1875-6 the washing was frequently interrupted, so that the total amount of work for the year did not equal three months of ten hour working days; this, together with the large outlay incurred in placing the mines in their present excellent working condition, accounts for the heavy expenditure of the year. Since the date of the balance-sheet there have been two runs—the November one yielding $10,500, with a profit of $6000, and that for December $8500, the profit being $4000. The directors call attention to the satisfactory character of these returns as indicating that the plan for opening the South Yuba claims, sketched out by the general manager in his report for last year, is proving successful, while the increasing product of gold from the gravel, as the workings advance towards the centre of the channel, warrants the belief that the washings henceforth will yield a steadily increasing profit. The retiring directors are Mr. Francis H. Lascelles and Mr. Reginald Bird, who, being eligible, offer themselves for re-election. The retiring auditor, Mr. A. Good, offers himself for re-election.

The CHAIRMAN said: Gentlemen, in moving the adoption of the report and accounts I do not intend to detain you so long as on previous occasions, for during the past year we have had many visitors to the mines, some of whom are present here to-day, and I shall ask them to give you the benefit of their own personal observations. At the time of our adjourned meeting in January, 1876, we were in the midst of one of the most severe winters ever known in the Sierra Nevadas; from the month of October it had rained and snowed with but little intermission, so that our new canal—its embankments only a few days old—was subjected to as severe a strain as ever it will have to endure; it became choked with snow, and gave us no water until the melting of the snows in May. The satisfactory feature is that it stood the test remarkably well, considering its newness, and from that time it has been of great value to the company, both in furnishing free water and in carrying water to the mines from the reservoirs of the South Yuba Water Company. The severity of the winter delayed the opening out and developing of the property in other ways; the men could not work the powder drifts, and when these were finished the powder was detained at the railway station for weeks owing to the roads being impassable. These difficulties are not likely to occur again to the same extent, because a narrow-gauge railway has been constructed to within an hour's drive of the property, and the blasting operations have at length been successfully carried out. After years of labour and great expense the portion of the property known as the South Yuba claims has been got into working order. These claims comprise that section of the auriferous gravels which is now being worked down to the bedrock. A glance at the map you have before you will show my meaning. It is the portion coloured blue, and is the only part of the property where we have as yet been in a position to tap the rich gravel lying on the bottom or bedrock, but we have now begun to get it into the sluices. I must ask you to follow me on the map while I endeavour to bring before you the present condition of the property, and I hope to give you a fair idea of its size and practically inexhaustible contents. Each block on the map represents two acres. There are five blocks on the channel covering Gopher Point, where it breaks over into the Yuba river. All of this gravel is rich, and is that portion alluded to in Mr. Price's report as being in the direction of O, 1 and 2. It will take considerable time to wash off, but can be taken in one bench to the bedrock. You have heard me speak of the narrowness of the opening of the South Yuba claim, and in consequence of the impossibility of washing continuously, the measurements I now will give will enable you to judge of the improvements in progress in this respect. Starting from point R 5, you have a distance to the face of the bank, on line 5, towards Gopher Ravine, of 578 ft., the whole of which is gravel. The face of this bank, running nearly parallel with Gopher Ravine, towards line 3, is 400 ft. in length, its height being about 200 ft., with 120 ft. of blue gravel on the bottom. The gravel, as was expected, has become softer as we approach the centre of the channel. From this bank to Gopher Ravine is a distance of 300 ft., most of which was broken and shaken up by the last blast of 11¾ tons of powder. Thus the total length of bank, when worked through to Gopher Ravine, will be over 900 ft. We will now turn and suppose ourselves to be working up the channel in a southerly direction, to point P 11, a distance of 2200 ft. The width of the gravel bank is here close on 1000 ft. From this point onwards you observe the gravel banks widen to the remarkable width of 3000 ft., and here in all probability, was the confluence of two ancient rivers—the one flowing in the direction of Johnson Creek and the other towards South Yuba claims. The depth of the auriferous gravel along line 12, judging from the inclination of the bedrock and the slope of the hill, must be from 200 to 300 ft., and nearly the whole of this immense mass has been tested by actual workings, which are shown on the map, and coloured yellow. You now at once see how small a fraction of the auriferous deposit has been worked to the bottom either by ourselves or the previous owners of the property. I will here notice the interesting portion of Mr. Price's report where he says that the richest part of the channel will be found in the short curve of Gopher Ravine. This is in accordance with the experience of gold washings on the bars of the modern rivers in California, the richest deposits being always found on the sides of the shortest curves. The South Yuba gravel has yielded for the year at the rate of 23½ cents per miners' inch of water used for 10 hours. You know we gauge the richness of the gravel by the quantity of gold it yields to the miners' inch of water in the space of 10 hours. The December run on this gravel yielded 40 cents per inch of water used for 10 hours; this is the richest yield we ever had, the run was only 105 hours, and it produced 9601., or 901. per day of 10 hours. We are working at two other points, on the Enterprise and Blue Lead claims. The Enterprise is working on top gravel, but the Blue Lead will be worked to the bottom through a bed-rock tunnel, constructed by former owners. During last winter the heavy rains caused the surface gravel on the southern side of the Enterprise claim to break back a considerable distance, marked on map as the slide; this necessitated the moving of the bulkhead from that side of the claim to its present firm position at 13, G. We have recently bought an additional monitor of the largest size for this claim, and we are fitted to use a larger volume of water than we ever were. The amount of profit henceforth is simply a question of the quantity of water brought to bear against the banks. In his report to the Foreign Office Consul Booker, Her Majesty's Consul at San Francisco, draws attention to the fact that every year more hydraulic mines are being worked, and I learn from him that the number of canals or mining ditches in California is 673, with a length of 5179 miles. For several years there have been disputes between the farmers and the miners respecting the damage alleged to have been done to their lands by the tailings or debris carried down the rivers from the mines, and various remedies have been suggested. A powerful miners' association has recently been formed, and I look for a settlement of the question upon some broad basis satisfactory alike to miners and farmers. Mr. Hughes was appointed superintendent at the mines last spring, and judging from his weekly reports, and from all we hear of him, we think he will make a trustworthy and competent superintendent. The accounts were made up in America to Oct. 31, since which date there have been two runs, both of which left a good profit—the November run having yielded $10,500, with a profit of $6000; and the December run $8500, with a profit of $4000—and you must bear in mind that a good deal of the water was bought water from the reservoirs of the South Yuba Canal Company; the rivers in California during the month of December being nearly dry, in consequence of no rain having fallen for a long time, so that both miners and farmers were suffering from an unwonted drought. However, the rains set in on January 16, and our superintendent expected to have water the following week—we know that other companies had water. The liabilities of the company in California are still heavy; some of them are on construction and canal cost account, but I hope they will now be speedily wiped out; it will not take long to pay them off with a good supply of water. We started with a small working capital to open up and develope a very extensive property, but we knew that while doing the dead work, as I may term it, the mines would materially assist us, and they have (including last returns) to the amount of 33,181l., of which 8922l. was produced this year. They have now began to show what they can do, and you can readily see from a study of the map that the more they are worked the larger becomes the area upon which the water can be used with advantage; they will, therefore, increase in productiveness for many years to come. I shall be happy to give any further information in my power, and shall now move the adoption of the report and accounts. (Cheers.)

Mr. R. BIRD seconded the resolution.

Mr. G. BATTERS said he was sure the shareholders would be pleased to hear the opinion of Mr. Bowe, who had recently visited the mines, and was well qualified to form an opinion as to their value.

Mr. J. E. BOWE said that during his stay in California in the latter part of last summer he visited Blue Tent five various times, and examined the property very closely, and could cheerfully endorse everything which had been said by the Chairman, as well as the main points touched upon by the manager of the mines. The amount of success really depended upon the amount of water, and the larger the quantity of water the greater of course would be the results from the working. He gave a detailed description of the property, and referred to the large amount of unworked ground on which the company had to operate. There was one point to which he would refer. He had been asked whether it was not possible that the bed-rock might rise and cut off the gravel? This was not possible. The ancient river upon which this gravel he had mentioned was deposited seemed to have overflowed its bed for a considerable distance on both sides. Generally in such cases the gravel was richest in the river bed, but in this case the gravel seemed to be about the same richness throughout. There was a great deal of speculative mining going on in California, but those persons who desired to make mining a commercial business invested their money in hydraulic mines, which were not of so speculative a character. In the Blue Tent they could see the large extent of auriferous gravel before them, and knew what they had to work on, and the result simply depended upon the quantity of water which they could command.

The CHAIRMAN, in reply to a further observation of Mr. BATTERS, said there were about 500 acres of ground to work, and as they could not work more than four or five acres a year the shareholders could calculate for themselves the probable duration of the mine.

Mr. NEAME, as a shareholder who had visited the mine, fully endorsed the opinion of Mr. Bowe relative to its merits. He also spoke in high terms of the able and trustworthy body of men at work at the mine.——The report was then adopted.

On the motion of the CHAIRMAN, seconded by Mr. DIXON, Mr. R. Bird was re-elected a director, and Mr. Bowe was elected a director in the place of Mr. F. H. Lascelles, whose business engagements has compelled him to resign.

The auditor, Mr. Good, was re-appointed, a very cordial vote of thanks was then passed to Mr. Thomas Price, the general manager, and a vote of thanks having been also passed to the Chairman and directors the meeting broke up.

MWYNDY IRON ORE COMPANY.

The fifteenth annual meeting of shareholders was held at 6, Queen-street-place, on Wednesday,

Mr. ALEXANDER BROGDEN, M.P., in the chair.

Mr. A. THOMSON (the secretary) having read the notice convening the meeting, the report and accounts were taken as read.

The CHAIRMAN said he had very few remarks to address to the shareholders. He supposed they were paying the penalty which usually falls to the lot of companies in very smooth waters, they did not succeed in getting very large attendances of shareholders at the meetings. He was very glad indeed to be able to congratulate the shareholders on the very successful working of the past year. Considering the position that the iron trade had unfortunately occupied during the past year it was very satisfactory to find that the company came out of it at the end of the year with such a handsome profit as that shown in the accounts. The profits for the year amounted to 12,593l. 14s. 3d., which represented a very handsome profit on all the business done. While these profits were being made the directors had not been unmindful of the future, and a great deal of very good work had been done towards the development of the mine in other directions: and, as the shareholders would have observed from the report, the directors proposed to charge to the revenue of the past year a very large sum on account of the expenditure of what was called the "Trecastle adventure." This was a neighbouring property upon which sinking operations had been commenced, and a very valuable mine had been discovered. The whole expense of this (3671l. 13s.) the directors proposed to charge, as on former occasions, against the revenue of the year. As the shareholders were aware, during the past year they had completed negociations which had been some time pending for the purchase of the Llwynsaer lease. This was an adjoining property coming close to the Mwyndy property, and since the company had obtained possession of the property they had driven 51 fathoms, and had raised a considerable quantity of ore from it. The ore raised during the half-year from the Llwynsaer property was 4000 tons, and it was being developed in a very satisfactory way. While speaking of the Trecastle property he should have mentioned that Mr. Pattinson had just recently assayed two specimens of the ore, giving excellent results. The first specimen gave 61·20 of metallic iron, and the second 62·30, which was richer than the results of the old workings at Mwyndy, and ought to command a higher price. The balance at the credit of the revenue account, including the balance brought forward from last year, was 17,411l. 2s. 1d. Out of this an interim dividend was paid in July last of 3000l., leaving 14,411l. 2s. 1d. for the meeting to deal with. The directors recommended that the balance should be appropriated, first of all, in paying the whole expenditure in the Trecastle adventure, 3671l. 13s.; and half of the entire cost of the purchase of the Llwynsaer lease, 3964l. 8s. 11d.; and then that a dividend of 3s. per share should be declared, leaving a small balance to be carried forward to the next account. He was sure the results must commend themselves to the shareholders. The mine was being managed in a satisfactory manner, reflecting in the highest degree credit on the management both with regard to those who conduct its affairs locally and to those who give it its general direction. The Chairman concluded by moving the adoption of the report and accounts.

Mr. JOHN TAYLOR (managing director) seconded the motion with great pleasure. He entirely coincided with the Chairman in believing that the accounts would give all the shareholders satisfaction, not only because they were paying a very fair dividend, considering the state of the iron trade during the past year, but because they had wiped off to some extent the expenditure for bringing fresh supplies of iron ore. They had now three sources of supply—the old mine (Mwyndy), which they would now be able to support and make perfectly safe for future working. From this mine the company had taken more than 800,000 tons of iron ore, which was in excess of the computations. He believed the same deposit of ore passed through to the Llwynsaer property, half of the cost of which had been paid for out of the profits of the year. They were now getting a considerable quantity of ore from this property, subject to a dead rent and royalty. Neither the one nor the other were excessive, and they would take great care that the royalty exceeded the minimum sum payable. Then they had the Trecastle adventure, which was situated some 2 or 2½ miles from Mwyndy. This belonged to another landlord, who had treated the company very well indeed. There eleven bore holes had been made with the Diamond boring apparatus, and in nine of them iron ore was discovered—in one or two instances of very good quality. A shaft had been sunk 30 fms., and after driving out a vein of very excellent iron ore was discovered, the assays of which the Chairman had mentioned. Their engine had been delivered, and the boiler had arrived, or was *en route*. In three weeks they would be ready with the engine at work to develope the mine in earnest, and with the best season to work it he hoped they would get a much better quantity of iron ore, so that they might expect in the future at least an equal amount of profit as that now being made. He took great credit for himself, for Capt. Vivian, and the directors for maintaining a constant supply of iron ore sufficient to yield a handsome profit on the actual capital invested in the concern. He had always endeavoured to make the mine a permanent success. The company would compare favourably with any in the kingdom for the economy and efficiency of its working. He had no wish to be self-laudatory, but he thought these facts should be brought before the shareholders.

The report and accounts were unanimously adopted.

The CHAIRMAN then moved that a dividend of 3s. per share, free of income tax, should be declared, making, with the interim dividend paid in July, 4s. 6d. for the year 1876, payable on the 15th inst. This was equal to 6 per cent. on the whole paid-up capital of the company, but equal to 15 per cent. on the market quotation for the shares at the present time, and considering what the state of the iron trade had been he thought the result a very satisfactory one.

Capt. R. W. PELLY, R.N., seconded the motion, which was carried *nem dis.*

On the motion of the CHAIRMAN, seconded by Mr. HOWSE, Messrs. Joseph Fry and John Taylor, the retiring directors, were re-elected.

Mr. TAYLOR, in returning thanks, expressed his regret that Captain Vivian had been very ill for some time, and that he had not yet entirely recovered. There never was a more honest or skilful manager than Capt. Vivian, and he thought they were indebted to him for the manner in which he had carried out the operations at the mines. (Hear, hear.)

Mr. MORGAN proposed, and Mr. PAINTER seconded, the re election of Mr. Scott, the auditor, which was carried.

The meeting then terminated, with a vote of thanks to the Chairman and directors.

WHEAL UNY MINING COMPANY.

The quarterly meeting of adventurers in this mine was held at the offices of the company, Austinfriars, on Tuesday,—Mr. R. MCCALLAN in the chair. The accounts for the quarter ending December showed a loss on the three months' working amounting to 855l. 19s. 8d., and a total balance against the mine of 355l. 19s. 8d.

The CHAIRMAN said that, taking all circumstances into consideration, the accounts were not unfavourable, as from the report of Capt. Rich it will be seen that, owing to the heavy rains, operations at the mine had been somewhat retarded, and the sinking of the engine-shaft will now be resumed. The mine, on the whole, is looking well.

Mr. WALTER PIKE thought the shareholders might be congratulated that the loss shown was so small, considering the disastrous floods the mine had to contend with during the past two months. Every mine in the district had been flooded with water, and in spite of the powerful pumping machinery they had the water in for more than a month, preventing work in the three bottom levels, where the best of the tin ground lay. He was glad to say that the water was now drained, and the sinking of the shaft resumed. It must not be concealed, however, that at the present price of tin the adventurers must not look for profits; in fact, there were not four mines in the county that would do so; but this might be said, that there were few mines that could feel the benefit of a rise in tin sooner than Wheal Uny. It may be some time before a recovery in the tin trade takes place, but it must certainly come. The adventurers have a valuable property in Wheal Uny, that at an average price of tin of the past 25 years would give handsome profits.

The agents' report was read, as follows:—

Feb. 12.—Owing to the late excessively heavy rains the bottom levels in the mine have been flooded during the past six weeks. We have, however, again drained the mine to the bottom, and hope soon to resume sinking the engine-shaft below the 160 fm. level. The lode in the bottom of this shaft is worth 2l. per fathom for the length of shaft (14 feet). The 160 end east is worth 8l. per fathom. The 160 west carries a little tin, but we have a capital lode in the bottom of the 150 west, and hope soon to intersect the same run of tin ground in the bottom of the mine. The 150 end, west of incline shaft, is worth 8l. per fathom. Two stopes in the back of this level are worth 8l. and 12l. per fathom respectively. The 150, east of Goodinge's, is suspended, and the men set to rise in the back of this level, with the view to communicate with King's shaft; the lode at this point carries stones of tin. The lode in the bottom of the 140, east of Goodinge's, is worth 8l. per fathom. The 140 end, east of King's, is worth 12l. per fathom. Two stopes in the back of this level are worth 18l. per fathom in the aggregate. The 130 east is worth 8l. per fathom. The stope in the back of this level is worth 10l. per fathom. The rise in the 60 west is worth 8l. per fathom. Three stopes in the back of the 120 are worth 33l. per fathom in the aggregate. The continued depressed state of the tin market, and the wet winter, have made against us, but the mine, on the whole, is looking well, and if we could have a better price for our produce should soon be able to give good profits.—W. RICH, MATTHEW ROGERS, W. BENNETTS.

The report and accounts were adopted, and the debit balance of 874l. 5s. 8d. was carried forward to the next account.

The usual compliment closed the proceedings.

ARGENTINE COMPANY.

A special meeting of the proprietors was held on Thursday, at the offices of the company, London Wall,

Mr. S. LLOYD FOSTER in the chair.

The CHAIRMAN: Gentlemen, the circular convening this meeting having been posted to every shareholder, I presume you will take it as read. The circular has, I think, placed the position of the company fairly before you, but it may be interesting if I go a little more into details on the present occasion, and the few facts I propose to give will, I feel sure, clearly show how and under what difficulties the works have been carried on up to the present time, and also how it has happened that our working capital, which was small at the outset, has been absorbed before the rich ore, which has been abundantly proved to exist in large quantities, has been rendered available. As soon as it was found that the capital would be insufficient, your directors took into careful consideration the most desirable means for providing the further amount required, and, as already stated in the circular, the directors received offers from responsible parties to subscribe the funds necessary, provided the board would issue debentures convertible within a given period into shares of the company. Seeing, however, that the great value of the property has been amply demonstrated, and that the option of converting debentures into shares will undoubtedly be a most valuable one, the directors did not feel justified in accepting such offers until each shareholder had been invited to subscribe his proportion on similar terms. (Hear, hear.) Now, to enable any debentures issued to be converted into shares it was necessary to create such shares, and this meeting has, therefore, been called to ask you to authorise an increase of capital by the creation of 5000 shares of 5l. each, which will make the capital 80,000l., and thus provide for the conversion of the debentures issued in the event of the subscribers availing themselves of the option. It may not be out of place here to refer to the shipment of the machinery, because the delay which took place in getting that machinery to the mines has of itself been the means of absorbing a considerable amount of the working capital which would otherwise have been profitably laid out on the mines. That there was no delay on this side you will, I am sure, see when I tell you that within two months of the formation of the company some machinery, amongst which were the articles most wanted, left this country—on Jan. 10, 1876. Other shipments were made on Feb. 10 and March 10, and the remainder was got off by May 10. I feel bound here to acknowledge the valuable assistance which was rendered by Captain Joseph Vivian, who was most indefatigable in his exertions, and assisted the directors most materially in enabling the various shipments to be got off in so short a time. (Hear, hear.) Now, it had been hoped that within one month after the arrival of the goods at Buenos Ayres—or I should say Rosario—they would have reached the mines, and as some portions did actually arrive on March 31, only a fortnight after the estimated time, it will be seen that the hope was not an unreasonable one. You will, however, readily understand how difficult it is to move the natives out of their ordinary pace, and unfortunately, although every exertion was made, a large portion of the machinery and stores, including the heavy pumping appliances, which were, of course, very much needed, did not reach the mines until nearly six months after the estimated time. This delay in getting up the country the machinery for the reduction works, as well as for pumping, had an unfortunate effect on the company's finances in three ways. It retarded the commencement of stamping operations, and accordingly much valuable time was lost before Capt. Coward could ascertain what appliances would be necessary for the treatment of the ores in large quantities. As soon as the lode was worked upon, and had been put through the stamps, Capt. Coward found that the general body of the lode had changed in character, and had been found to contain a much larger quantity of pyrites than he had expected; so much so that he was forced to the conclusion that calcining (as was explained in the circular) would have to be carried out to such an extent that the ordinary furnaces would be found wholly inadequate, and I should add too expensive, to deal with such a large quantity of concentrated mineral, and accordingly on September 26 last Capt. Coward informed the board by telegram that an Oxland's calciner was indispensable. I will refer to the calciner fully later on. The delay before referred to had a prejudicial effect also in another way, inasmuch as it prevented any appreciable quantity of ore being obtained from the richest lode discovered so far—the Piqué; so that in addition to the reduction appliances being found inadequate Capt. Coward has been forced to treat comparatively poor ores, and even those most inefficiently, until the pitwork had been fixed in the Piqué shaft, and the mine drained. This, as I shall presently explain, has now been accomplished. Another effect of the delay was that it prolonged the period during which salaries to the staff and other fixed charges have continued without the full benefit being derived therefrom, such as will be the case when the operations are carried on upon a more extended scale; because, as many of you will doubtless remember, 16 miners and mechanics were sent out when the first portion of the machinery left this country—in January, 1876. It is needless to point out that these men were absolutely necessary in order that Capt. Coward might have a sufficient staff to repair the existing machinery, erect the new, and get the mines opened out with the utmost dispatch. (Hear, hear.) You will readily understand that when organising operations depending upon the proper working of a variety of machinery, especially in such a country as your mines are situated in, a skilled staff is indispensable, and at first this staff must necessarily appear large in proportion to the total force employed, but as things get into systematic order the same staff can superintend a much larger force. The outlay for skilled labour must, of course, remain more or less constant, whether the works are on a large or a small scale, whilst the ordinary labour will vary in proportion to the extent of the operations. It will thus be seen how the delay in the organisation of the works occasioned by the non-arrival of the machinery and stores has absorbed capital, seeing, as I have just mentioned, that the pay of the European staff and other fixed charges had to be provided for. It must not for one moment be supposed that the capital thus absorbed has been thrown away. Capt. Coward is not the man to have kept the English force idle at any particular time simply because circumstances prevented their being occupied according to a pre-arranged plan. Any plan, however carefully laid out, must in such a country be liable to modification. On the contrary, gentlemen, a large amount of valuable work has been done, of which the company will ultimately reap the benefit. Of such work I may mention the repairing of the old machinery, erecting stamps and other reduction machinery, and building a furnace, which has been and is of considerable service, though inadequate for our requirements. Then, again, much labour has been expended on canals for bringing in water, and ponds for storing the same, as mentioned in Capt. Coward's reports, cutting and securing engine-shaft for the pumps to work through, which, owing to the vicinity of old workings and to runs of ground therefrom, was an expensive and somewhat dangerous task. Now, however, that this has been completed it will greatly facilitate the economical working of the mine. Levels have been driven to open out the lode and provide for a supply of mineral, and in order that ore may be economically brought to surface a whim-shaft has been made, and a skiproad fixed and the tramroad repaired. I think, gentlemen, I have now explained that our two drawbacks have been an unavoidable delay in getting our pumping machinery up to

the mines, and the want of adequate reduction appliances to effectually treat the pyriteous ores, which are believed to be the richest. I have good grounds, I think, for stating that these difficulties will soon disappear—in fact, I may say one has disappeared already, for Capt. Coward advised by telegram on Jan. 26—"Sinking in Piqué commenced; appearance of lode rich." The remaining difficulty—the inadequacy of the reduction appliances—is being rapidly got over, and although no material improvement must be expected in the produce until Capt. Coward is in a position to effectually calcine the whole of the concentrated sand, we may, I think, fairly look for a gradually increasing improvement in the yield as soon as the stamps are provided with mineral from the bottom of the Piqué lode, which I take it will very shortly be the case, seeing that sinking has been commenced. Now, as regards the reduction appliances. In spite of the delay which has arisen, we have at the present time 24 heads of stamps in working order, also two buddles and eight arrastres; the buddles, as you may be aware, are for concentrating the ore, and the arrastres for extracting the gold by amalgamation. I may here mention that we have another 12 heads of stamps, two more buddles, and four more arrastres on the mines, which will be erected as soon as other more pressing work has been completed. I find that I omitted to mention one important work which has been attended to—putting the engines into proper repair. You are, no doubt, aware that we have two excellent engines on the mines—one a 24-in. cylinder, for drawing water and mineral from the Piqué; and the other a 34 in. cylinder, which works the reduction appliances, and this engine has flat-rods attached for pumping water from the south shaft, which on reference to the plans you will see commands the "Captain" section. As so much stress is laid by Capt. Coward upon the calciner I will endeavour to explain the subject, and I feel confident that you will give your directors credit for having done everything that was possible to provide, send out, and ensure the speedy transport of the machine called for. We only received the order for it on Sept. 27 by telegram, and on Nov. 10 it left Liverpool by steamer. (Hear, hear.) Now, as this machine contains about 13 tons of ironwork, which all had to be made, there is, I think, great credit due to Dr. Oxland for so promptly carrying out the wishes of the board. (Hear.) You have already been informed that Capt. Coward had most satisfactorily carried out the Board's instructions as to making special arrangements for the carriage of the calciner up the country, seeing that on Dec. 10 he had a troop of carts in Rosario awaiting the arrival of the steamer containing the calciner, and which arrived on Dec. 13; and I now have great pleasure in announcing that two days ago we received a telegram advising that the calciner had arrived at the mines. (Hear, hear.) This prompt arrival is most gratifying, and I may mention that Mr. Charles Oxland, whom we have sent out to see that it is properly erected, will be due at the mines in a few days. (Hear, hear.) It is, of course, impossible to say how soon the calciner will be got to work, but this I will say that I am sure no time will be lost, seeing that Capt. Coward is so fully sensible of its extreme importance, and will, no doubt, have made every possible preparation so as to facilitate the work of erection. Carefully prepared directions and detailed drawings, supplied by Dr. Oxland, were sent out to Capt. Coward, so as to reach him before the arrival of the calciner, It may be interesting to contrast the working of the ordinary furnace with what we have good reason to expect from the Oxland calciner. The furnace constructed by Capt. Coward, which does its work remarkably well, is only capable when properly attended to of roasting 4 tons of concentrated mineral per day; but Capt. Coward's experience is that it is impossible to secure proper attention from the native workmen, in addition to which uniform treatment cannot be ensured. Now Oxland's calciner has been practically proved to be capable of treating from 20 to 25 tons per day, and as it will be worked by machinery instead of by hand we can depend both upon obtaining full duty and uniform treatment. (Hear, hear.) I may mention that the relative cost for fuel is an important item. The present furnace entails considerable expense in this respect, whereas the calciner will require very little fuel after it has been once lighted, as, owing to its construction, Dr. Oxland states that when once a fire has been got up the ore will burn of itself, from the combustion of the sulphur contained therein. I may mention that Capt. Coward has had considerable experience with these calciners. Under date Dec. 19 last he wrote, "I have had a practical knowledge of the working of these machines, having seen nearly every one erected in Devon and Cornwall." I do not think it necessary to take up your time with many remarks, seeing that detailed reports are regularly transmitted to you on the subject; but it is satisfactory and encouraging to note that Capt. Coward continues to express the most unbounded confidence in the great success of the mines, and although the Piqué is the only section, so far, where a rich lode has been systematically opened up, he has the highest opinion of the other mines, and reiterates his firm belief that the property is no speculation, and that on getting the calciner to work the results will satisfy the most sanguine. (Hear, hear.) With regard to the Piqué, I will give you an extract or two from his recent reports. In October he writes:—"It must be borne in mind that there is no uncertainty about the 44 north at the Piqué opening up and making available the rich deposits of ore visible ahead on the Cano Largo, and to the north of the Cano. Only a few months more time is required before this will be effected." You will, of course, bear in mind that Capt. Coward is here referring to the level north, whilst in the level south there is the lode (referred to in the circular), 26 ft. wide, which he says in his report for September, "Will yield at least 90 tons of ore per fathom, and as yet we have no wall on the western side." This ore he estimates is worth 2 ozs. of gold to the ton. (Hear, hear.) There is one more circumstance which, perhaps, I ought to mention, and which has militated against us—the financial crisis on the River Plate. Credit has been so severely shaken that whereas in ordinary times bills might be negociated in Buenos Ayres to provide the funds required at the mines, we have had to send out remittances from this side, and shall probably have to continue to do so for some time to come, unless we sell our gold in that country, which it is not desirable to do for many reasons. As I have already stated, the directors propose to raise the further funds required by issuing debentures, and in order that holders of such debentures may be able to convert the same into shares, we have called you together to-day to sanction an increase of the capital. The necessity for an increase of the capital is, of course, to be regretted. We expect large profits, and the less capital we have to distribute those profits over the better; but, even with the additional sum we now ask you to sanction, the capital will stand at a very low figure compared with other foreign enterprises of any magnitude, and when you consider the richness of the mines, the engines, machinery, and buildings upon them, and the advanced state of the works, your property stands you in at a remarkably small cost. The judicious expenditure of a few thousands more in developing a property such as yours is comparatively nothing, when the question of its value after being opened out is duly considered, and I firmly believe you will soon have the gratification of seeing their immense value proved as conclusively by actual profits returned as it has been already demonstrated by experience and assays. (Hear, hear.) In Capt. Coward I believe you have a first rate miner and a conscientious man. He has had difficulties to encounter which could not have been foreseen. A great deal of his time has been unnecessarily but unavoidably taken up with the commercial management, but from recent advices he appears to be receiving considerable and satisfactory assistance from the newly appointed reduction officer and cashier, and is consequently able to devote more time to the mining operations, for which work, I have already stated, you could not, I fancy, find a more suitable man. With these remarks, gentlemen, I will move—"That the capital of the Argentine Company (Limited) be and is hereby increased from its present nominal capital of 60,000*l.* to 80,000*l.*, by the creation of 4000 new ordinary shares of 5*l.* each, such shares to be considered as forming part of the original capital of the company, and to be issued by the directors from time to time in such quantities and proportions, either at a premium or a discount, and generally under and subject to such conditions and stipulations as to payment of the sum of 5*l.* per share by cash payment, or conversion of debentures into shares or otherwise, as the said directors shall think fit, and free from any liability to issue the same under the terms and provisions of the 35th clause of the Articles of Association, or any other clause in the said Articles relating to the issue of fresh capital."

Mr. GEORGE BATTERS: Mr. Chairman and gentlemen, I rise with much pleasure to second the resolution which has just been read to you by our worthy Chairman. I feel sure, gentlemen, that you must all be highly gratified by the lucid and exhaustive description of the position of the company. Indeed, I feel sure in seconding the resolution it is not at all necessary for me to trespass upon your time. I fully endorse the remarks of our Chairman as to the value of the mines, and, in fact, I believe we have one of the richest gold mines in the world, and that in a very short time it will not be necessary for anyone to say what they think, for facts will speak for themselves. A lode, gentlemen, 26 ft. wide, and no west wall, yielding 90 tons of ore per fathom, giving 2 ozs. of gold per ton, is a marvellous thing to my mind, and when we get the calciner erected, which no doubt will be done in about a couple of months, the results will be all we can desire. With these few remarks, gentlemen, I beg to second the resolution.

Mr. SAMUEL J. WILDE: Mr. Chairman and gentlemen, I will not detain you long. I quite approve of what the directors have done, but I must say I do not think much of your law. You have allotted debentures before you have the power to issue debentures convertible into shares; and if I heard you correctly, Mr. Chairman, the resolution you have just read does not make any reference to the conversion of debentures at all.

The CHAIRMAN: I am sure the meeting is most indebted to you, Mr. Wilde, for pointing out anything you consider incorrect, because as a barrister your knowledge on such subjects is entitled to every attention, but I think that your interpretation of the boards' circular is scarcely correct. We have not allotted any debentures, but, on the contrary, you will find in the last paragraph the following words—"*will* be allotted to you, provided." In explanation of that circular I may mention that it was thought it would be calculated to put the meeting in a better position to pass an opinion on the expediency of authorising the increase of the capital if the board were able at this meeting to give some idea of the feeling of the shareholders on the subject, and the shareholders were invited to send in their forms more as an expression of opinion, and indicating the feeling of the proprietors, and was not in any way intended to be taken as an allotment. Shareholders were merely told what their proportion would be, and which amount would, if they thought proper, be allotted to them, but it was not intended to allot the debentures until after the resolution increasing the capital, if passed, had been confirmed.

Mr. C. S. HILL: I must confess that I have been somewhat surprised at receiving on the present occasion so thorough and comprehensive a statement of the position of the company with which our Chairman has favoured us, and I feel sure that everyone present must be as much gratified as I am. It certainly does appear that the delay which has taken place has been owing, to use a hackneyed phrase, to circumstances beyond control, and I feel sure that the energetic policy which the directors have so forcibly exhibited will enable Capt. Coward to repair the delay without further loss of time. I do not propose Mr. Chairman to take up the time of the meeting, but merely to remark *en passant* that I question the policy of fixing the price for the conversion of the shares at one premium. I think it would have been better to have said par, and let the shareholders have the benefit of it. It certainly appears evident, Mr. Chairman, from your remarks that Capt. Coward has had difficulties to contend against which he had no right to expect; and I take it, Sir, from the fact of various changes having been made in the staff that Capt. Coward did not receive that amount of support from some of the officers of the company which he had a right to expect, and which had it been rendered might have materially facilitated the development of the company's property.

Mr. F. G. LANE: Mr. Chairman, I quite agree with the remarks of the last speaker with regard to the price named for the conversion of the debentures 1*l.* premium. I think it is very paltry, and that it would have been much more desirable to have offered them at par, and as regards 7½ per cent. it is not enough.

The CHAIRMAN: I am sorry that you should think the directors have adopted an illiberal policy. As regards the interest—7½ per cent., the board having perfect confidence in the value of the property, consider 7½ per cent. ample. (Hear, hear.) A high rate of interest means, as a rule, doubtful security—(hear, hear)—and as regards the price at which the debentures are to be converted it was thought that the option at 1 premium was a most valuable one, and more consistent with the present market value of the shares than par.

Mr. BATTERS said he thought that if 5*l.* prem. had been fixed the option would be a valuable one.

Mr. BERRY asked whether the list of applications for debentures was to be considered closed? He thought shareholders might, after the statements which had been made that day, be inclined to come forward.

Mr. LANE concurred in this view, and and added that he thought the fact of a telegram having been received advising that even from Desmontes they had been able to extract 12 dwts. per ton might make shareholders wish to avail themselves of their allotments. (Hear.)

The CHAIRMAN said there was no desire to fix any arbitrary date. If any shareholder wished to join in the issue of debentures the board would much rather that the shareholders came forward and reaped the benefit of the conversion into shares than that strangers should do so. He (the Chairman) might mention that the replies from shareholders had resulted in applications for between 9000*l.* and 10,000*l.*, and that he would undertake to fill up the balance to-morrow; but if any shareholders wished to take up their proportion, or any portion, he would much prefer entertaining such applications. (Hear.)

Mr. C. S. HILL suggested that, as the point had been raised as to the legality of the offer which had been already made to the shareholders, it might be desirable to allot the debentures again after the proposed increase of capital had been duly authorised. (Hear, hear.)

The CHAIRMAN promised that the question should receive the careful consideration of the board. (Hear.)

Sir WILLIAM SMITH (a director): Gentleman, in order to remove a misapprehension which might otherwise exist as to the proper construction to be put upon the telegram relating to the produce for January, it may be as well to point out that the 12 dwts. per ton extracted must not be taken to represent the gold contents of the 250 tons of mineral stamped during the 18 days, because the calcining appliances, about which you have heard so much, are not sufficient, you must bear in mind, to treat the concentrated sand from more than 100 to 150 tons, even supposing the furnace was able to be kept going the whole of the month. It will, therefore, be seen, I think, that the yield of 12 dwts. per ton from Desmontes, or refuse ore—though to my mind highly satisfactory—is considerably below the percentage of the gold contents of the ore which we shall be able, without difficulty, to extract as soon as we can calcine all the concentrated mineral. (Hear.)

The resolution authorising the creation of 4000 new shares was then put to the meeting and carried unanimously.

A cordial vote of thanks to the Chairman for his conduct in the chair, and the directors collectively, terminated the proceedings.

ELGAR SILVER-LEAD MINING COMPANY.

The general meeting of shareholders was held at the company's offices, Gresham Buildings, Basinghall-street, on Thursday,

Mr. F. E. BINGLEY in the chair.

Mr. GRANVILLE SHARP (managing director and secretary) read the notice convening the meeting, the directors' report and balance-sheet being then submitted:—

The CHAIRMAN said—Gentlemen: The report and balance-sheet which have been forwarded to you will have given you some idea of the present state and prospects of the Elgar Mine, and also of the financial position of the company. But before I ask you to adopt and pass those documents I will, with your permission, supplement them by a few observations. I am sorry that we do not meet to-day under more prosperous circumstances, for I need hardly say to you that it would have been a much pleasanter duty for me to perform if I could have announced to you the forthcoming payment of a dividend instead of having to appeal to you for means wherewith to arrive at that desirable result. That it will be reached, and at no very distant day, I do not think there can be any reasonable doubt; for I will venture to affirm that no practical miner who has seen or may see this mine will hesitate to assure you that with a further very moderate expenditure and judicious management certain success must follow. If a property like this should be allowed to remain dormant for want of capital, when capital is so abundant and good investments really scarce, it would indeed, be a strange anomaly; and I trust it only requires the shareholders to be convinced of its nature and capabilities to induce them to subscribe the requisite funds. And as our managing director will be able to satisfy you on this point better than I can, I will only call your attention to one or two features in Elgar which to my mind clearly indicate the existence of rich deposits of silver-lead ore, which can be won and worked at a comparatively small cost. In the first place, you have a lode which has been pronounced by competent authorities to be one of the finest and grandest lodes in the Principality of Wales—a lode not only of great magnitude, but one which possesses all the characteristics that a thorough miner loves to see. Here is a specimen of it, look at it gentlemen, and if that is not attractive enough to draw gold from your pockets to develope it I do not know where you will find one Now, this lode, which is well known to be the champion lode of the district, passes through the whole of the Elgar sett for about a mile in length, and at a depth of 20 fms. it has been proved for a length of 40 or 50 fms. to yield lead and blende ores in paying quantities, which will no doubt continue upwards to very near the surface, and in sinking the winze to the 10 below adit the produce is improving as depth is attained. In addition to this lode another has been discovered a little to the south of it, of which Mr. Francis, in his report, says that "in stripping down this lode a rich vein of silver-lead, or what is termed steel-grained ore, has been opened out for several fathoms, which will yield large profits when you think proper to take it down." Now, it is expected that these two lodes will in depth merge into one and form a large body of silver-lead ore. I will now leave these and other points in the mine to be enlarged upon by one more competent, from his greater experience, than I am to satisfy you as to their value. And here it may be as well to remind you, as an inducement for you to increase your stake in this property, that future operations will be conducted under the supervision of a gentleman who has earned for himself a high reputation in the mining community by his successful efforts in connection with other mines, and more especially by his brilliant achievement at West Chiverton. Doubtless some of you are aware that through the exertions and perseverance of Mr. Sharp that mine was rescued from total collapse and ruin, and within a couple of years its market value raised from 3000*l.* to upwards of 60,000*l.*, and from it being a losing concern to a flourishing property, now paying, and likely to pay, perhaps, for generations to come, large and increasing dividends. As a slight recognition of these services Mr. Sharp was presented with a testimonial of 500 guineas. But I must not forget to add that to enable Mr. Sharp and his able co-adjutor, Capt. Southey, to effect this great transformation he had to call upon the shareholders for 7000*l.* That call was, I believe, promptly responded to, and for that response, and their confidence in Mr. Sharp, the West Chiverton adventurers have been splendidly rewarded. And so will you and the shareholders of this company be rewarded if you adopt a similar course—have confidence in your managing director, support him with the necessary funds; and believing, as I most sincerely do, that in Elgar there are elements of success equal, if not superior in some respects, to those at West Chiverton, I shall look forward without any anxiety to the accomplishment of equally satisfactory results. One word more, gentlemen, before I sit down. In the few years that I have been connected with mining I have seen enough to convince me that there is a great future for lead mines in this country, and that there is no more legitimate channel for the profitable employment of capital. It is true I cannot myself boast of having realised anything from it beyond a good deal of care and anxiety, but I can now see the reason, and if I should be spared a few years I may hope to utilise the experience I have gained, and derive some profit from it. And now I can truly say that were I in possession of means to do it I should not hesitate to subscribe all that is required to develope Elgar. Unfortunately, we commenced business with too small a capital; this was a great mistake, for which I take a large share of blame to myself, and although I endeavoured to atone for it by advances to the company as long as I was able, I still deeply regret that such a mistake was made. And yet, gentlemen, when I think of the mine itself, of the treasure it contains, and the wealth it is destined to produce, I cannot but feel some consolation and relief, for I do look forward confidently to the time when the success of Elgar will be so appreciated by the shareholders that they will cease to remember the mistakes and difficulties of its early management, and deem themselves amply compensated for any delay that may have occurred in the realisation of their wishes. Gentlemen, the amount of capital already spent and required yet to be laid out at Elgar will, I believe, compare very favourably with what has been required for the development of the majority of mines. Do not, then, I entreat you, let others come in to reap the harvest which a little more seed upon that you have already sown will most assuredly produce. But act in this matter as under similar circumstances you would act in your ordinary business, with the same thoughtful intelligence which you are accustomed to exercise on other subjects, free from prejudice, and with a determination to give this undertaking a fair chance of recouping you handsomely for your outlay, and I have not the least doubt that the result will prove eminently satisfactory to you all.

Mr. JAMES seconded the motion.

A SHAREHOLDER: What means are likely to be adopted to raise the additional capital?—The CHAIRMAN: There is a suggestion that it is not considered a sufficient inducement to the shareholders to subscribe for more shares if we do not give them in some shape or other a bonus. The directors have taken that matter into consideration, and think they will apply to the shareholders generally to relinquish a certain number of shares, in order that bonus shares may be offered to these parties who are willing to subscribe the requisite amount. I think I may add that it is proposed to issue a circular to that effect.

Mr. M'NAUGHTON said he doubted whether the necessary capital would be subscribed on those terms.

Dr. GIBBON said he was prepared to assist the company, but not while the debenture debt of 1200*l.* remained upon it.

The CHAIRMAN regarded the debentures as a very trifling charge upon a property of such value.

Mr. SHARP said that they might be extinguished at any moment when the company was in a financial position to do so.

Dr. GIBBON asked for how long a period the debenturers extended?—The CHAIRMAN said three years.

Mr. GRANVILLE SHARP: There has been a great mistake committed in floating this company, as Mr. Bingley has admitted—that the operations were commenced before the whole of the capital was subscribed. Had the shares forming the complete capital of the company been issued I believe you would have had now in Elgar one of the finest properties in Cardiganshire. I speak from what I have seen, and from a very fair knowledge of mining, although am not a practical miner. We have our machinery erected, and are in a good position to work the property if we only had the additional amount we now require. I hold 500*l.* of the debenture debt, but I tell you plainly I am not going to take advantage of any gentleman connected with the Elgar Mine. I am desirous of seeing the thing carried out fairly, and in a miner-like way, and I have no doubt of a successful result If we can simply raise 1000*l.* it would place this company in a very good position. I should not, in fact, care to have more until we see the result of the expenditure of that sum. If you feel inclined to go on I feel satisfied you will be amply recouped.

Mr. HUGHES (of Aberystwith) said he had a high opinion of the mine, and on this point all who had spoken were agreed. Hence it would be a work of time if they did not take a practical view of the subject, and consider what was to be done for the future of the property. His relations had formerly spent a large sum of money on the mine, and still had the greatest confidence in it, and if all the present shareholders were to come forward he had no doubt that in Aberystwith a considerable number of shares would be taken up. If the sum of 2000*l.* were properly expended he believed, from all he had heard, the results would be very satisfactory. If something were not done, and that quickly, the company would go into liquidation, and other people would reap the benefit which ought to belong to the present shareholders.

Mr. GRANVILLE SHARP said he would take up his proportion according to the shares he held, which were over 2000 in number.

Mr. PATRICK C. DAN: I will do the same.

Mr. SHARP added that he did not mind whether there were bonus shares or not. He would accommodate himself to the arrangement made.

One or two other shareholders said they would subscribe in proportion to their holdings.

The CHAIRMAN said he must remark that the offer of Mr. Sharp was a very liberal one.

Mr. M'NAUGHTON then suggested that 3000*l.* should be raised, and part of the proceeds be applied to paying off the debentures. It might then be worked with the balance. What he desired was that the shareholders should run together, and that one should not have the advantage of the other.

The CHAIRMAN said it only wanted a united effort on the part of the shareholders to bring the company to a great success.

Mr. EVANS: Have you considered the advisability of issuing preference shares?

The CHAIRMAN said these could not be issued until the whole of the capital had been subscribed.

Mr. HUGHES said that in Aberystwith the shareholders would be prepared to fall in with any suggestion that might be made.

The report and accounts were then unanimously adopted. The auditor, Mr. T. Evans, was re-elected, at a remuneration of five guineas. The sum of 800*l.* was subscribed towards the required amount by a few shareholders in the room, and the meeting closed with the understanding that the directors should call another meeting at an early date, to report the result of the proposed application to the shareholders.

TALYBONT SILVER-LEAD MINING COMPANY.

At the second general meeting of shareholders, held at the offices of the company in Talybont, on Feb. 5 (Mr. JOSEPH FELL, of Forest Gate, Essex, in the chair), the directors' report was read by Mr. G. H. KEENE, the managing director, as follows:—

The directors, in issuing their first annual report, have much pleasure in congratulating the shareholders on the satisfactory results of the preliminary and exploratory operations which have been accomplished. As shareholders are aware, the Talybont is a mine of great antiquity, and enormous quantities of ore have been at different times extracted. Under these circumstances it became a question for determination whether operations should be continued on the old lodes, or whether the unworked lodes existing in virgin or new ground should be opened up. Acting under the experienced advice of the company's agent, Captain Thos Glanville, the directors decided to adopt the latter course. It may be well to state some of the considerations which influenced this decision. The area of unworked ground is considerably over a mile in extent on the run of the lodes, and, therefore, presenting a practically inexhaustible field of operations and capacity for the production of mineral. The configuration of the mountain is most conducive to economical working. As regards the shaft and winzes sunk, and levels driven, &c., on the new lodes, the shareholders have been acquainted with all particulars by means of Capt. Glanville's reports. It is, therefore, unnessary for the directors to reiterate such details. The works which have been accomplished, although most essential for the permanent benefit of the company, could not from their character be expected to be immediately remunerative. Therefore the fact that upwards of 500*l.* worth of silver-lead has already been dressed and sold cannot but be considered most satisfactory. The time has now arrived when increasing returns may be anticipated, and the directors look forward with confidence to the great and lasting prosperity of the company.

The CHAIRMAN moved that the report, with the accounts, be received and adopted.—Mr. BOURNE, of Clifton, Bristol, seconded the motion.

The CHAIRMAN: I am sure you will agree with me in saying that the directors took a wise step in deciding to hold the present meeting on the mine. Had they consulted their own convenience only the meeting would have been held in London. It happens that upwards of four-fifths of the proprietors reside in the country, the majority of them living at as greater a distance from the metropolis than from the mine. Therefore, the holding the meeting on the mine enables such shareholders as take sufficient interest in the company to achieve a double object with one journey—to attend the meeting and to inspect the property belonging to the company. When we consider the recklessness with which some persons invest their money, it must be a great satisfaction for some of them to be assured that the Talybont Company possesses a mine at all. To all proprietors it must be a great satisfaction to see the present prosperous appearance of our surface and underground operations. The number of Talybont shareholders is upwards of 400, and the company has no liability of any sort, kind, or description. Now for a few words relative to a matter most important for your consideration—our mining operations. This is a subject with which I feel competent to deal, for I frequently visit the mine, and I have paid great attention to the works. I most positively state it is impossible for them to be conducted more efficiently or more economically. There is an old Cornish saying that "a good bal makes a good captain;" well, if it be true that a good mine makes a good captain, it is most certainly true that it requires a good captain to make a good mine; and we may congratulate ourselves, for we are doubly fortunate—we have a good mine and a good captain. As the directors state in the report, the operations have been chiefly directed to the proving and development of the lodes in the virgin or unworked ground. How successful those operations have been you have learned from time to time by the detailed reports of Captain Granville, who will answer any questions which any shareholder may favour us by asking: 269 years ago last Thursday was commenced one of the most successful enterprises ever undertaken by man. I allude to the conveying of the New River to London. You all know Sir Hugh Myddleton's connection with that company, and I presume you are aware that he obtained his wealth from the Cardiganshire Mountains, in the midst of which we now are. With this fact before us it may be asked why do we not continue the old workings? Well, I will tell you. It is but a just tribute to the intelligence of those of past generations who worked our mine to suppose that they took away all the ore they could get. Of course the want of pumping machinery was their great drawback. We, of course, could by means of modern appliances sink much deeper. But in mining the deeper you go the more your operations become expensive. There is no possible reason why, with development, the newly-discovered lodes we are working now should not prove equally as rich as the old lodes. Therefore, I contend that our present operations are most advisable. How great the success that is awaiting us will be none can say, or how soon that success may be realised. Remember that impatience is the curse of mining. You must sow before you can reap. Let us hope we are near our golden harvest. Our past operations have not betrayed us, and we may with justifiable confidence trust the future. I beg to move the adoption of the report.—Carried unanimously.

The CHAIRMAN: At the first meeting of this company, held twelve months since, ten guineas each was voted to the directors for their services to that time, and it was proposed that their future remuneration should be left for the shareholders to decide in general meeting. Mr. Keene, the managing director, receives a salary of 100*l.* a year, and, in addition, he receives the registration fees of 1s. per transfer. We cannot say that Mr. Keene is overpaid. You have now to decide what the remuneration of the other two directors—Messrs. Hilton and Grieves—shall be for the past year. As our operations have been preliminary, I think we should vote the sum of fifty guineas each for the past year. We can be more liberal when we pay a dividend.

Mr. Sydney Smith was re-elected auditor at a remuneration of fifteen guineas.

A vote of thanks was passed to Capt. Glanville for his efficient endeavours on behalf of the company. A vote of thanks to the Chairman terminated the meeting.

GLANGWDEN LEAD MINING COMPANY.—The statutory meeting was held at the offices of the company, Old Broad-street, on Thursday,—Mr. J. M. Davis in the chair. The Chairman introduced Mr. Lefeaux, managing director of the company, and local superintendant at Llanidloes, to the meeting as the pioneer of mines in the Llanidloes district, and the first to develope the Van Mine, which has led to the payment of 300,000*l.* in dividends. Mr. Lefeaux reported as to the favourable indications being daily met with, and explained that the working capital may be considerably reduced. He anticipates that after payment for machinery 150*l.* per month for 12 months will be sufficient to develope the mine to a profitable

condition. Mr. Parry (director) suggested that in consideration of the very favourable views expressed by Mr. Lefeaux the remaining unapplied for shares (5*l.* each) be offered to the public, and that 10s. on application and 10s. on allotment would be sufficient in lieu of 2*l.* 10s. as stated in the prospectus. This was agreed to, and a vote of thanks to the Chairman concluded the meeting.

WEST CHIVERTON—THE NEW MACHINERY.

Under the management of Capt. Richard Southey West Chiverton is making rapid strides. Not satisfied with the success which he has already attained, Capt. Southey has introduced into the mine a system of jigging machinery for the purpose of dealing with the mass of halvans on the mine, which has been the accumulation of many years, and the trial, short as it has been, is sufficient to prove that an immense quantity of stuff hitherto regarded as worthless is capable, under this process, of yielding a good profit to the adventurers. Jigging machinery is not altogether a new thing. Messrs. Hunt, Green, and Collom have all had a turn at it with more or less successful results, but the machinery now at work at West Chiverton contains improvements which have been introduced by Capt. Southey himself, and, by a very simple process, it is capable of successfully dealing with the most stubborn stuff that can possibly be treated with. To witness the working of the new jiggers, a large party met on the mine on Monday at the invitation of Capt. Southey, and were accompanied by him over the works. The capabilities of the machinery were fully shown and the process clearly explained by the managing agent, and, two hours having been thus spent, an adjournment to the account-house was made, where an excellent dinner was provided. Mr. Granville Sharp, secretary to the mine, occupied the chair, and Mr. Thorman Woodward the vice-chair. After dinner the usual loyal and patriotic toasts were proposed, and were received with customary enthusiasm.

The CHAIRMAN, in proposing the health of Capt. Southey, said there was no doubt that he had saved West Chiverton from becoming a total wreck, and not satisfied with that he had gone still further. (Hear, hear.) It was evident that Capt. Southey had many enemies, as shown by the letter of "Observer," which recently appeared in the *Mining Journal*. No doubt there were many "observers" about, but taking them altogether they were a rotten lot, and if the writer of the letter in question had only the manliness to sign his name he would have found himself completely shut up, and, perhaps, might have been driven to skedaddle out of the country—(laughter)—because it could have been proved beyond a doubt that the whole letter, from the beginning to end, was a tissue of lies. It was a nasty, spleenish letter, prompted, no doubt, by somebody who was formerly connected with the mine. He had no hesitation in saying that had the mine remained in the hands of the old party another three months it would ere this have been in the Stannaries Court. He only wished, for the benefit of Cornish mining, that that Court could be done away with altogether, for he thoroughly believed that it was a curse to Cornish mining. (Hear, hear.) They did not want it at all. The County Court was quite sufficient for the purpose of recovering debts up to a certain amount, and after that they could go to the ordinary law courts. But instead of this the Stannaries Court was a nice little sinecure for some of their legal friends in Cornwall, and he defied any man to contradict him when he said that that Court was a detr ment to Cornish mining, and that it should cease to exist. (Hear, hear.)

Capt. SOUTHEY, in returning thanks, observed that the machinery had nothing new about it. It was composed of a little from one, and a little from another, and a little of his own—(hear, hear)—and between the whole he flattered himself that they had got a machine which would compete with any he had yet seen. (Hear, hear.) The stuff which they were now treating had been in the burrows for many years, and it was the most stubborn refuse that could possibly be dealt with. It was stuff comprising four minerals—lead, blende, copper, and mundic—and the difficulty which they had to contend with was in separating the four after they had shaken off the waste. Seven-eighths of the waste was shaken off by the jigging machinery, but the separation of the four minerals could not be effected by water in consequence of the very slight difference in their specific gravity. The lead, therefore, was extracted, and the rest was sold together. They were enabled by their present machinery to turn over at least 80 tons of stuff per day, and supposing that they only made a produce of 1 per cent. that would be sufficient to pay costs. But he certainly should not like to sell the burrows at the rate of 1 per cent. (Hear, hear.) A produce of 2 per cent. would give them a profit, and he was glad to be able to state that while the entire cost of working the jigging machinery, from the time the stuff was taken from the burrows until it became saleable, did not exceed 50*l.* per month, they were able to return at least 300*l.* per month, thus giving them a clear monthly profit of 250*l.* (Applause.)

Mr. KENDALL mentioned that he had been consulted with regard to the erection of similar machinery in Germany, but while there he had certainly seen nothing equal to the machinery which they had inspected that day. He believed it was capable of treating at least 100 tons of stuff per day, and that on blende alone it would yield a profit of 200*l.* a month, leaving lead out of the question altogether. He was so convinced of the excellence of the machinery that he should at once strongly recommend its adoption in the German mines.

Capt. SOUTHEY said the lead returns might be put down as at least equal to the blende. People had said that they could not do without blende in West Chiverton, but he desired to give that an unqualified contradiction. He would much rather have the machinery for lead than for blende.

Capt. WHITE, of Wheal Peevor, expressed himself very highly pleased with what he had seen. He believed the machinery was capable of treating any amount of stuff that might be passed through it, and the immense accumulations which they had on surface was an indication of what they had underground. He was satisfied that in West Chiverton they had an excellent mine, and that in Capt. Southey they had a first-class manager.

Mr. WOODWARD, responding for the toast of his health, congratulated the adventurers that the predictions of those who were formerly connected with the mine had been falsified, and that West Chiverton was still making good returns. Last year they sold silver-lead ore to the value of 20,000*l.*, and blende worth nearly 10,000*l.*, and the adventurers could imagine what amount of stuff it was necessary to turn over in order to produce such excellent results. (Hear, hear.)

Mr. S. KENDALL, at the invitation of the Chairman, said he had been especially struck with the excellence of the new jigging machinery, and he was not prepared to suggest the slightest improvement to it. (Hear, hear.) The adventurers had reason to be greatly indebted to Captain Southey for all that he had done on the mine. (Hear, hear.)

The health of Capt. Roberts (the second agent) was proposed by Capt. BROWN, and drunk with great cordiality, the CHAIRMAN himself speaking in the highest terms of the manner in which Capt. Roberts discharged his duties.

Capt. ROBERTS, in reply, expressed his utmost confidence in the new jigging machinery, which originated solely with Capt. Southey, who alone was worthy of all the praise for the results that were being obtained. The subject was one worthy of the consideration of the Mining Institute, which might do much more good to mining generally by the discussion of a question of this kind than by the consideration of a question which enabled interested persons to advertise their own commodities and explode their own ideas. ("Hear, hear," and laughter.)

The CHAIRMAN, in complimentary terms, proposed the health of the engineer of the mine, and —— Mr. J. HOCKING, jun., in acknowledging the compliment, explained that the principle of the new machinery consisted in separating and sizing the mineral as it came from the crusher by means of different sized sieves. He had great faith in the success of the process, and he was very glad indeed to know that Capt. Southey was so convinced of its value that he had determined to introduce it at Wheal Jane in order to see how far it would answer in the production of tin. (Hear, hear.) Although the minerals treated with were different in their nature the *modus operandi* was the same, and if it was successful in the one case he saw no reason whatever why it should not be successful in the other. (Applause.) Capt. Southey having made up his mind to erect a jigger at Wheal Jane, he, as the purser of that mine, would only be too glad to give him all the encouragement and assistance in his power. (Applause). He regarded the introduction of this machinery into tin mining as of the very greatest importance. In his opinion it was useless for them to hope that tin would again reach 100*l.* per ton. Therefore the best thing they could do was to deal with the times as they found them, and endeavour to make the best of their position. If they could make mining pay with tin at 50*l.* or 60*l.* a ton let them be content and fight with the times like men. (Hear, hear.) He believed the jigging machines were capable of being worked at a large profit, and he hoped to see their number increased at West Chiverton, so that they might be enabled to work upon the almost inexhaustible quantity of stuff they had upon surface. (Applause). Mr. Hocking, in conclusion, proposed the health of the Chairman, which was very cordially drunk, and Mr. SHARP having suitably responded, one or two other complimentary toasts followed, and the proceedings terminated.—*Western Daily Mercury.*

THE EMMA MINE.—A meeting to consider the position of the action now being tried in New York, and to take steps relating thereto, is convened for Monday. The hearing has been going on since December 13, and is likely to continue another month. The secretary's statement explains that the effect of abandoning the American suits would, of course, have been to allow judgment to go by default, with its inevitable result, an immediate winding-up of the company on a judgment for costs, and, moreover, the consequent destruction of the powers given to Mr. MacDougall, under the special resolution, to carry on any proceedings in the name of the company either here or in America. The company are represented by Mr. E. W. Stoughton, of the American Bar, and Mr. W. D J. Foulkes, an English barrister. The action imputing falsehoods and fraud is, as the secretary remarks, one of a most serious nature, in which the defendants are contending for fortune and character, and they are not likely to omit (and have not omitted) any means of defence. They are represented by three counsel of great eminence at the New York Bar—Mr. Phelps, Mr. Beach, and Mr. Chittenden—and the case has assumed a magnitude which Mr. Stoughton, in writing to the Chairman, describes as of "almost unprecedented length and difficulty." The hearing of it commenced on Dec. 13, and has occupied every day of the sittings of the Court ever since, and it is expected that it will last a month, and probably two months, longer. The mine was sold in September last, under judgment legally obtained, to a Mr. Lincoln for 28,800*l.*, and that there is no other property belonging to the company, while the only resources which have been at the disposal of the directors for all purposes are the balance of 1844*l.* 7s. 3d., as shown in the report of the directors presented at the last general meeting. It must, therefore, be plain to the shareholders that the proceedings in the New York Courts having assumed such a magnitude the funds at the disposal of the directors are altogether inadequate for the carrying on of this litigation to its conclusion. Mr. Stoughton and Mr. Foulkes having urged that a special meeting of the shareholders should be called, and it being absolutely necessary that some arrangement should be immediately made with reference to counsell's further fees, Mr. Stoughton, in a letter to Mr. Foulkes fixing his fee for the trial at 3000*l.*, says "I need not say to you how exacting of my time, thoughts, and labour, the trial has been and is to be—for all this you are compelled to share with me. It is a trial in its nature most difficult, for it is an action to recover damages for false and fraudulent representations (utterly unlike a suit to rescind), whereby the defendants obtained from the plaintiffs some five millions of dollars, and as the defendants are contending for fortune and character they are not likely to omit any means of defence. You are aware that the trial has continued, and is to be prolonged over a period of great activity in the Courts in which I am usually engaged, and that I must refuse, surrender, and postpone engagements when they conflict with this at very considerable pecuniary sacrifice. The cause in which we are engaged is one of very great complication and difficulty, involving many questions of law and fact, the latter depending upon voluminous written and oral contradictory proof. I have faith in the justice of our case, and confidence that we shall succeed, but only at the expense of earnest, continued, and anxious labour."

ENGLISH AND AUSTRALIAN COPPER COMPANY.

The annual meeting of shareholders will be held on Thursday, when the directors' report will state that—

The gross quantity of ore, regulus, precipitate, and rough copper received from various mines from July 1, 1875, to June 30, 1876, has been—1875-76, 13,751 tons 16 cwts.; 1874-75, 12,249 tons 8 cwts. 3 qrs. The quantity of ore, regulus, and precipitate smelted at the Port Adelaide Smelting Works from July 1, 1875, to June 30, 1876, was—1875-76, 7924 tons 15 cwts. 1 qr.; 1874-75, 7452 tons 2 cwts. 3 qrs.; and smelted at the Newcastle Smelting Works during the same period, 6478 tons 17 cwts. in 1875-76, and 5244 tons 15 cwts. in 1874-75.

The quantity of copper made at the Port Adelaide Smelting Works from July 1, 1875, to June 30, 1876, was 2043 tons 6 cwts. 0 qr. 24 lbs. in 1875-76, and 1938 tons 6 cwts. 2 qrs. 17 lbs. in 1874-75; and quantity of copper made at the Newcastle Smelting Works during the same period was 893 tons 19 cwts. 1 qr. 17 lbs. in 1875-76, and 730 tons 1 cwt. 1 qr. 7 lbs. in 1874-75.

The quantity of copper shipped from and sold in Australia during the year ending June 30 has been—

	1875-76.	1874-75.
Copper shipped from South Australia ...Tons	1825 4 1 17 ...	1384 8 2 4
Copper sold in South Australia	218 3 1 18 ...	557 1 1 26
Copper shipped from Newcastle	658 16 2 0 ...	583 0 0 5
Copper sold in Newcastle	237 5 1 5 ...	147 1 1 2

SUPPLIES OF ORE.—It will be observed that the supplies of ore, &c., show an increase of 1502 tons, compared with those of the previous year; this has been chiefly occasioned by increased business with the mines on Yorke Peninsula and New Caledonia.

NEW CALEDONIA.—The supplies from this source were steadily increasing, the quantity received at Newcastle and advised as afloat since the close of the financial year under review amounting to about 1600 tons, or more than the whole quantity received during the past year.

BURRA BURRA MINE.—There was an apparent shortcoming of Burra ore delivered during the year, but that was principally owing to the ore being dressed up to a much higher percentage than formerly. The quantity was likely to increase, as more ground had been opened, and a greater number of pitches had been let.

MINES IN THE FAR NORTH.—The supplies from the North had diminished, owing to the general feeling that it was useless to attempt the development of the mines from the great cost of carriage until the railway was commenced, but large supplies were looked for from this district in the future, especially as it contemplated to form a powerful company to work these mines, when a wide scope would be opened for the profitable employment of capital. The Act of Parliament for the construction, at a cost of over a million, of a railway from Port Augusta northwards for more than 200 miles through a rich mineral district, was passed by the Government of South Australia in July last; and at the date of last advices the necessary steps were being taken to carry out this important undertaking.

The operations of the company both at Port Adelaide and Newcastle present several favourable features. The supplies of ore were large, the purchases were judiciously made, and the smelting expenses were conducted with all possible economy, whilst coal is becoming gradually reduced in price, and the labour market likely to be lower from the large amount of immigration promoted by the Government of the colony. Had the price of copper been maintained without any violent fluctuations the result must have been satisfactory. There was a fall, however, of 14*l.* per ton between the price of Australian copper at the beginning and end of the year. In January it stood at 89*l.* per ton; in August it had fallen to 75*l.* per ton; and by the end of the year it stood again at 85*l.* per ton. The great depression appears to be due not only to the dulness of trade, but also to the new system adopted of large periodical sales of copper by public auction. The statistics relating to copper show that improved prices must follow any revival of trade.

The profit and loss account for the year ending June 30, 1876, shows a balance at the credit of 1975*l.* 9s. 4d., to which has to be added 16,838*l.* 0s. 3d., the balance of profit on July 1, 1875, making together the sum of 18,813*l.* 9s. 7d. Out of this amount the 25th dividend of 2s. per share, and the 26th dividend of 2s. per share, have been paid, and the directors now recommend a dividend of 1s. per share, payable free of income tax on March 1. The reserve fund remains at the amount at which it stood on June 30, 1875—11,010*l.*, 4s., with the addition of a year's interest, 440*l.* 8s. 2d., making 11,450*l.* 12s. 2d., secured by copper warrants. The following directors retire by rotation:—The Right Hon. G. C. Bentinck, M.P., and J. Russell Frewer, who are eligible for re-election.

FOREIGN MINES.

ST. JOHN DEL REY MINING COMPANY (Limited).—Advices received Feb. 2, 1877, dated Morro Velho, Jan. 1:—

GOLD EXTRACTED TO DATE.—The produce extracted during the second division of December, being a period of 11 days, amounts to 14,929·7 oits. It has been derived as follows:—

	Oits.		Tons.	Oits. per ton.
From general mineral	7,571·2	from	1304	= 5·806
Mineral roughly freed from killas	6,431·0	,,	734	= 8·761
	14,002·2	,,	2038	= 6·870
Re-treatment	927·5	,,	—	= ·454
Total	14,929·7	,,	2038	= 7·324

Equal to .....1721·1513 ozs. = ·8445 oz. per ton.

The above is better produce than was obtained in the second division of November. It may be seen while the yield from the mineral roughly freed from killas has not given so high a standard as was extracted from it in November, the general mineral presents a better gold contents and produce to the extent of 1·3 oits. per ton. The standard yield in that division was 6·919 oits., and in the present, as may be seen, 7·324 oits.

The 11 days, second division of December, has given a larger yield of produce by about 500 oits. than the 12 days of November.

Advices received to Feb. 15, 1877, ex Tagus (s.), dated Morro Velho, Jan. 17.

Non-delivery of letter 605 in time for Guadiana.

I am exceedingly sorry the above letter was not delivered at Rio in time to go forward by the Guadiana. Letter 605, dated Nov. 2, was duly posted at Ouro Preto on the forenoon of the 4th, more than two hours before the making up of the post there for Rio de Janeiro. The time for the delivery of that mail in Rio is fixed by contract with the Government on the evening of the 7th at 6 P.M., the sailing of the Guadiana having been also fixed for 8 A.M. on the morning of the 9th. There was, therefore, ample margin of time to allow for the proper delivery of the letter for the Guadiana. Letters are delivered at the General Post Office on the night of the arrival of the Minas Geraes mail.

I regret very much to learn that any inconvenience should have been thus caused to the board or the proprietors, though the written information given per same mail by the agents that—"We expect a further letter this morning, but the post from Minas has not arrived"—ought to have shown the non arrival of that mail was the cause of the non-delivery, and the non-receipt of the delayed letter.

Care shall be taken in future to send the fortnightly letter as completely as it can be prepared by an earlier post from Ouro Preto, though the occurrence of Sunday often intervening retards the preparation of that letter.

The roads have lately been in a most terrible state even for mules to pass over, and the railway communication has also been interrupted from earth slips of the banks and falling of one of the bridges, so that we may, I fear, have been subjected to greater delays, and further non-delivery of both mails and letters from Minas during the past two months.

GENERAL OPERATIONS.—At present we have a cessation from the heavy and almost continuous rains, which have made the roads in many districts impassable, and caused serious interruption to the public traffic on the railway leading from the metropolis into Minas Geraes.

A number of earth slips have occurred about the roadways and cuttings, but the company's water-courses have conveyed the water supply to and through the establishment during the trying period through which we have passed, without the least failure or interruption.

The traffic through the timber districts had been suspended, but in one line, that of Mattosinhos, it is now re-opened, and timber is being received therefrom.

The other line of road leading to Taquarassu is being cleared, and we expect logs to a considerable extent will be brought in the course of one week from this time. Some of the largest log timber comes from this district.

The internal and general operations of the company have been carried on steadily without interruption, giving quite average duty.

PRODUCE FOR THE MONTH OF DECEMBER.—The gold extracted for the month of December amounts to 41,487·3 oits. = 4782·8107 ozs. troy. It has been derived as follows:—

	Oits.		Tons.	Oits. per ton.
From general mineral	21,021·0	from	3492	= 6·020
Mineral freed from killas	17,768·6	,,	2181	= 8·146
	38,789·6	,,	5673	= 6·838
Re-treatment.....	2,697·7	,,	—	= ·474
Total	41,487·3	,,	5673	= 7·312

= 4782·8172 ozs. troy = ·8430 oz. per ton.

During the month of December the mineral roughly freed from killas has given an average yield per ton of 8·575 oits., and the general mineral has given 6·494 oits. This includes the gold recovered from that part of the auriferous sand re-treated in the arrastras, which gave ·474 oit. per ton. It should be stated here that owing to the spalling-floors having been rather crowded with arrastra and other large stones of mineral, the separation of the large pieces of killas from the mineral treated separately was very imperfectly done during the greater part of December.

The spalling-floors have been pretty well relieved of this hindrance, and we hope in future to show better results in treatment of mineral roughly freed from killas.

The produce for the month is 3072·9 oits. above that of November, and the yield per ton is 7·312 oits., as compared with 7·115 oits. in November.

COST AND PROFIT.

The produce being	41,487·3 oits.	
Deduct loss melting into bars.....	221·5 ,,	
	41,265·8, at 7s. 9d. per oit. =	£15,990 9 11
Cost		7,216 7 7
Profit on the working for December		£ 8,774 2 4

The cost is apparently higher than that of November by about 622*l.*, but the exchange is also 1d. per milreis higher, and this makes a difference in the sterling amount of (say) 288*l.* 13s. The cost for labour is a little larger, and other charges coming in at the end of the year make up the increased amount.

In round numbers the cost is 488*l.* more than the average monthly cost during the past year. The profit is 550*l.* more than was made in November.

MINE DEPARTMENT.—The general work of the department has been carried on with regularity, and very fair duty has been performed in the timberwork, stoping, and raising of mineral for the spalling floors.

The attendance of natives, on the whole, has been satisfactory, giving the following results for the month of December:—

	Mine Wagons.
Mineral quarried and conveyed to spalling-floors.....	6,662
Natives in attendance average daily	148·24
Borers in attendance average daily	100·20

Borers' duty per man per diem being 2·65 mine wagons. The sinking, as before briefly noted, for December being 4 ft. 3 in.

During the first fortnight of January the native attendance has been large, and would have given a higher average had not the New Year's holidays diminished somewhat the daily number.

The mineral raised and delivered at surface in the first 13 days amounts to 3489 mine wagons. The natives averaged for the same period daily 139·61, and borers 96·46, thus giving a duty per borer of 2·77 wagons, which may be considered from our present stoping ground very good duty.

The westward stope in the B section is still giving a large proportion of killas. It is right, however, to take it away, even if it does reduce produce.

The pumping and hauling have worked regularly, and no inconvenience has been experienced in the mine, notwithstanding the heavy rainfall we have had during the last few weeks.

REDUCTION DEPARTMENT.—The crowded state of the spalling-floors during the early part of the month of December greatly embarrassed the general duty of separating and spalling the mineral. There was a large supply of mineral, but it was a good deal mixed with killas, more especially the body of mineral received from the B section of the excavation.

The mineral reduced in December is returned at 5673 tons. From this quantity of mineral 5776 cubic feet of sand was treated by the amalgamation process, and this yielded gold to the extent of 7·182 oits. per cubic foot.

The total produce, as already stated, amounted to 41,487·3 oits. from 5673 tons = 7·312 oits. per ton, not differing very much from the gold contained in the cubic foot of auriferous sand as caught in the stamps strakes, which gave 7·182 oits. per cubic foot.

The stamping mills and other reducing machinery have been kept pretty steadily at work, the arrastres having plenty of water-power for keeping all at full work.

GOLD EXTRACTED TO DATE.—The mineral treated since the beginning of this month, or rather during the first division thereof, being a period of eight days, has given a gold return of 10,154·3 oits. It has been derived as follows:—

	Oits.		Tons.	Oits. per ton.
From general mineral	5109·0	from	844	= 6·053
Mineral freed from killas	4393·3	,,	544	= 8·085
	9507·3	,,	1388	= 6·849
Re-treatment	647·0	,,	—	= ·465
Total	10,154·3	,,	1388	= 7·314

Equal to ... 1170·6252 ozs. troy = ·8433 oz. troy per ton.

The above produce is better than the third division of December gave (6·286 oits. per ton). The cause of this low produce is the increased proportion of killas stamped with the mineral.

The spalling floors are now comparatively clear of the arrastra stones and poor mineral which had accumulated on them; and opportunity and facilities afforded for rejecting the large pieces of killas or conveying them to the Praia Works, so that we shall have a better recovery of the gold contents of the mineral effected.

ERECTION OF SECOND STONE-BREAKER.—This machine has been erected, and placed parallel with the first one, being driven by the same shaft from the turbine. It was put to work on the 9th inst. It is strong, and capable of doing good duty. These two machines, if properly attended to, are capable of breaking nearly the whole of the mineral required for the stamps. Yesterday in 14 hours they broke 184 wagons. Even at this rate, ten other hours work would more than provide for the daily consumption of the stamping mills.

The gold troop was dispatched from Morro Velho on Jan. 13, taking nine boxes, containing 26 bars gold, weighing in all 39,664·7 oits. = 4572·4623 ozs. troy, for shipment per Tagus for Southampton and London.

The gold has duly arrived. The following telegrams have been received:—

On Jan. 19—"Produce for month (December) 41,500 oits. Yield, 7·3 oits. per ton.

On Jan. 29—"Yield, 7·3 oitavas per ton. Profit for month (December), 8700*l.*" Telegram unintelligible. Repetition requested.

On Feb. 6—"Produce 13 days (second division January) 13,250 oitavas. Yield, 8·2 oitavas per ton. Produce small, from large temporary admixture of quartz and killas."

DON PEDRO NORTH DEL REY (Gold).—Report for December: Produce from 1568·3 tons, dry weight, 5525 oits. = 2348*l.* 2s. 6d. Cost, including all general expenses, 2·56*l.* 16s. 3d. The exchange is higher this month, otherwise a larger profit would have been shown.—Telegram from Rio, Feb. 10, advised 4300 oits. for the month of January.

SANTA BARBARA.—Mr. Hilcke, Jan. 14: During December 1010 tons of mineral were stamped, yielding 3·876 oits. per ton, or a total of 3713 oits of gold, which, valued at 8s. 6d. per oit., amounts to 1578*l.* 0s. 6d. as the estimated value of the produce for the month. The mine working cost for the same period was, at exchange 25¼*d.*, 928*l.* 11s. 2d., thus leaving an estimated profit of 649*l.* 9s. 4d. for December. The capital expenditure during the month, on the No. 5 stamps and new Senzala, amounted to 183*l.* 11s. 6d.—Mine: Owing to the advices being in duplicate only, the mine captain's and reduction officer's reports for December are not yet received; but Mr. Hilcke reports that the operations on the lode during the month had not led to any material alteration in the same. At No. 1 stope the lode showed no improvement, and it had been decided to suspend the stoping here and drive No. 2 level for the lower stopes. At No. 5 level, north of No. 1 shaft, the lode is also less productive for gold than it has been, and, it being absolutely necessary to push on with this place, the portion of inferior ore extracted during December had been rather above the average, causing a somewhat lower yield of gold to the ton of ore as compared with the month of November.—New Works: No. 5 stamps would be ready to go to work about the end of January, the continuous rains having retarded the work, and the plank required for the launders could not be brought in, owing to the almost impassable state of the roads. The Senzala was finished and all the blacks removed thither.

PITANGUI (Gold).—Mr. Hilcke (Pari, Jan. 14) reports that the adit had been been driven 5 fms. during December, in which month several hard channels of ground had been met with, thus retarding the progress of the miners. The total length of the adit was 39 fms. on Dec. 31. A few more hands had been taken on for explorations which it was intended to make at Morro das Almas, where there was a beautiful-looking jacotinga, well worth exploring. This exploration will be carried on on a small and inexpensive scale, so that if no success is met with the cost will not be felt.

RICHMOND.—Week's run, 858,000; week's produce of refinery, 835,000.

— R. Rickard, Jan. 27: Very little work has been done in the mine during the past week: nearly all the men were laid off for a few days, owing to an accident to the machinery of the furnaces. On Sunday last the connection of the cross-head and piston-rod broke, which occasioned such damage to the engine that we were obliged to stop. I then started the small engine, which worked on until Wednesday morning, when it also got disabled, it not being strong enough to drive the necessary machinery for three furnaces. I am having everything put in repair as soon as possible. I hope to get everything ready by to-morrow afternoon, when we shall start the five furnaces.

ALMADA AND TIRITO.—Telegram from Mr. Breach: Profit for December, $3000; lode in Tirito shaft at 47 fms., promising.

ARGENTINE.—Telegram, San Juan, Feb. 12: Eighteen days' stamping, 150 ozs., the produce obtained from 250 tons—great floods. Oxland's calciner has arrived at the mines. Pique pitwork working.

SAN PEDRO (Chili).—W. Phillips, Jan. 2: In the 150 the shaft sinking below this level is down 25 metres (say 13½ fms.); the progress made has not been so good as I expected since last report, as we have been obliged to timber, or rather secure, one of the sides, and at the time of the pay the men who had the contract cleared out, and we had to get others to replace them. For these reasons we shall not reach the 165 until the end instead of the middle of this month. In the 122 we have suspended our works here. In the 110 we are sinking a chiffon by the side of the old works at 24·50 per metre, and also driving an end round the same at 24 per metre; these are both producing about enough ore to pay expenses. In the 88 we have now commenced to drive on the opposite side of the works to where we had the bunch of ore at this level to prove the ground in this direction. We have decided that our wisest policy is to husband our resources as much as possible, so as to direct our energies to cutting the manto at the 165, and with a view to this we have reduced our works and expenditure as much as possible, and shall not again increase them until we meet with something good. The machinery and everything underground and at surface is working in a satisfactory manner.

CONDES OF CHILI.—James Seccombe, Dec. 19: The total quantity of ores dispatched from the mines in November was 410 tons, and during the first 15 days of this month 224 tons were sent down, and yet we are accumulating on the floors. I have now 650 or 700 mules in regular work. At present I have 450 tons of ores at Corral Quemado (smelting works), 53 tons promised to be taken by the Liguria to-day, and 100 tons in the railway-station here and Valparaiso, which, with a further quantity of about 50 tons, will go by the next steamer.

James Seccombe, Jan. 2.—We have now two reverberatory furnaces smelting regulus, which article, according to assays made, is worth about 60*l.* per ton. Difficulties and delays in getting the turbine repaired and properly fixed have prevented out smelting by blast as yet, but I expect to have it at work next week, and with it I see no reason why we shall not produce good pig-lead rich in silver. The Lower House of Parliament has passed an Act granting a privilege to a Mr. Houston to build a railway (2½ ft. gauge) from Santiago to the Condes. If this is carried out it will, undoubtedly, double the value of our mines.

Telegrams: Valparaiso, Jan. 28: 170 tons of raw ore have been shipped per Lucayas (sailing vessel); 50 tons of raw ore and 5 tons of regulus have been shipped per Cotopaxi (Pacific steamer). In Isolina Mine, at Batters' shaft, the lode is improving in richness going down, the lode in the bottom averaging 70 lbs. per fathom. Send 10 miners forthwith.—Feb. 3: 18 tons of regulus and 30 tons of raw ore have been shipped per Potosi (steamer). Isolina Mine, Batters, estimated value 100*l.* per fathom.

[For remainder of Foreign Mines see to-day's Journal.]

CURES OF ASTHMA, BRONCHITIS, RHEUMATISM, &c., BY DR. LOCOCK'S PULMONIC WAFERS.—Mr. Dadley, Chemist, 21, Carter Gate, Nottingham, writes:—"January 4, 1877. Several cases of asthma, bronchitis, and rheumatism have been cured within the lapse of a very short time by the wafers." In asthma, consumption, bronchitis, coughs, colds, rheumatism, and all hysterical and nervous complaints, they give instant relief. Sold by all druggists at 1s. 1½*d.*, 2s. 9*d.*, 4s. 6*d.*, and 11s. per box.

ANTHRACEN.

Anthracen and its derivatives have played so important a part in connection with the development of our national industry that a collation of the almost innumerable memoirs which have from time to time appeared upon the subject in the various scientific journals of France, Germany, and England will be found of great practical utility to a very large number of industrials. This collation has been made by Mr. G. AUERBACH, of Sudbury, and the result has been published in a handsome volume* by Messrs. Longmans. The author states that when the first German edition of the work appeared four years ago it was his purpose to render it as complete as possible, so that everyone might find all researches bearing upon anthracen and its derivatives duly classified without requiring to search for the memoirs scattered through scientific journals. The novel and important facts ascertained during the past four years rendered the re modelling and completion of the book necessary. Thus, in a technological point of view, Mr. Auerbach instances the discovery of accurate methods of determining the value of anthracen, whereby the utterly untrustworthy processes with alcohol and bi-sulphide of carbon have been superseded; further, the researches on the formation of alizarin from monosulphanthraquinonate of soda, &c.; and in the purely scientific region he mentions the beautiful researches of Bäyer and Caro on the synthesis of anthraquinon derivatives from phthalic acid and phenoleu; the investigations of Liebermann chrysammic acid, and many other investigations of distinguished interest.

With regard to the history of the substance, Mr. Auerbach states that in the year 1832 Dumas and Laurent discovered a hydrocarbon, which they obtained from those portions of coal tar which boil at the highest temperature. From their analyses they deduced the formula $C^{15}H^{10}$, and as this formula was 1¼ times the molecular weight of napthalin they named the newly discovered body paranapthalin. Laurent, who examined this compound further, and described some of its derivatives, proposed the name of anthracen in place of paranaphthalin. He was led to this change by the consideration that a number of hydrocarbons polymeres of napthalin were present in coal tar, all of which were entitled to the generic appellation of paranaphtalin. The researches of Fritzche, Berthelot, Limpricht, Anderson, Graebe, and Liebermann, and others, are fully recorded; and, with reference to its production, it is stated that anthracen is most readily formed from those parts of coal tar which boil at the highest temperature, of which, according to Crace Calvert, it forms only 1 per cent. The manufacture of anthracen from coal tar is thus conducted. If the coal tar be distilled in the usual manner each 1000 kilos., or 900 litres, yields on the average about 13 to 14 litres of ammoniacal liquor, 29 to 30 litres of very light oils containing benzol, 90 to 100 litres of light oils still containing a little benzol, and fit for use as lamp naptha. If the process be broken off at this juncture there remains in the still the so-called asphalt—a black mass, semi liquid even when cold, and consisting of heavy oils and of pitch. If, on the contrary, the distillation be continued, as is commonly done, from 300 to 312 litres of heavy oils, so-called creosote oils are obtained. The residue in the still is then fluid enough to be run off when hot, but on cooling it congeals to a black, shining, brittle, solid mass—"hard pitch"—which softens only at high temperatures, and which, even in summer, can be carried in open carts without packages. In many cases the distillation is only pushed so far as to yield 190 to 200 litres of the heavy oils. The residue is then soft pitch—an intermediate step between asphalt and hard pitch, and somewhat flexible. At slightly elevated temperatures it becomes soft and plastic like wax, and in the heat of summer it melts, and can, therefore, only in winter be transported unpacked in open carts.

The heavy oils consist of liquid olly hydrocarbons, naphthalin, phenol, cresol, and similar products, and contain also more or less anthracen. On account of the separation of naphthalin and anthracen at reduced temperatures they have often a butter-like, smeary consistence; their colour is at first yellow or yellowish green, but on exposure to the air passes gradually into a brown, which constantly grows darker. The distillation of the heavy oils, especially if it be intended to obtain lubricants and anthracen, may be appropriately divided into two or three periods. The substance most valuable as lubricants, naphthalin, cresol, and phenol, are relatively the most volatile, and pass over first. Anthracen does not appear until the last period of the process. The phenomena observed during the fractional distillation are these. The distillate first passing over, if a small sample be allowed to cool in a flat vessel is found to deposit naphthalin in crystals. As long as this takes place the oil is collected separately, and is used for the impregnation and preservation of wood, for which purpose it is peculiarly fitted on account of its high percentage of phenol and carbolic acid. When the distillate remains fluid on cooling it is collected in another receiver and used as a liquid lubricant. After a time the distillate on cooling no longer remains fluid, but assumes a thick paste-like consistence due to the deposition of paraffin. This "green grease" containing heavy oils, naphthalin, phenanthren, and anthracea, is the principal material for the manufacture of anthracen. The paste-like mass is first "whizzed" in a centrifugal machine. The residue, still containing many oils, is heated to about 40° C., and introduced into powerful hydraulic presses, which, if practicable, are fitted with hot plates in the style of oil presses. In this manner the greater part of the oils is removed, leaving a cake rich in anthracen. This anthraceniferous mass, which is obtainable by more than one method is then purified, the processes of purification being very numerous.

The various processes of producing the crude cake, and of its subsequent purification, are described in great detail, and as the advantages and disadvantages of each are carefully pointed out, the practical manipulator will be materially assisted by the information given in determining which, under any given circumstances, it is most desirable to follow. Few have had more experience both in the laboratory and in the manufacture of anthracen derivatives, especially artificial alizarin, than Mr. Auerbach; so that a more reliable work for all engaged in the manufacture and use of artificial colouring matters could not be wished for.

THE LIFE OF WILLIAM FAIRBAIRN.

The name and works of Sir William Fairbairn have been so long familiar, not only to the engineering profession but to Englishmen generally, that the publication of his life† will be hailed with satisfaction by a large number of readers. The subject of the memoir was born at Kelso, Roxburghshire, on Feb. 19, 1789, his father being a small agriculturist, and his mother the daughter of a tradesman in Jedburgh, and his boyhood and apprenticeship with no incidents but such as are common to the lives of all boys and young men. Soon after he was out of his time he came to London, and was promised work by Rennie, but the foreman directed them to the Millwrights' Society, membership of which was necessary before they could start work. The society kept them starving about for a month awaiting their decision, and then refused them admission, so that he and his companion—Hogg—had to leave London on foot and penniless, but fortunately obtained work at Cheshunt, and the temporary job finished they returned to London, and having got admission to the Independent Millwrights' Society, they got employment at a patent ropery at Shadwell, and enjoyed themselves as best they could. He joined a Mr. Hall in the invention of a digging machine, which was condemned by the Society of Arts, and which he himself soon found to be useless, and his funds being exhausted he undertook to make a machine to cut meat for sausages for a pork butcher in Tottenhamcourt road. He worked at various places when he could obtain anything to do, and at last, after four days sail from Llandaff to Dublin, where he arrived with three halfpence in his pocket. He obtained employment of Mr. Robinson, of the Phœnix Foundry, to make a new set of patterns for some nail machinery which he was then introducing into Dublin. The construction of the machines occupied the whole summer, and in October he left for Liverpool, the passage, then considered a quick one, occupying two days. After staying two days at Liverpool to look at the town he went to Manchester, and got employment with Mr. Adam Parkinson, with whom he remained for above two years. He was laid up the whole of the winter of 1813-14 with scarlet fever. He saved a few pounds, and in June 16, 1816, he married Miss Mar.

In 1817 the only good bridges over the Irwell were the Old Bridge and the New Bayley Bridge, the condition of the wooden bridge called Blackfriars was in such a condition as to render a new one indispensable, and premiums of 150*l.* and 100*l.* were offered for designs. He prepared designs in his leisure time, and submitted them to Mr. Hewes, by whom he was employed as draughtsman, asking his advice as to putting them in. Mr. Hewes hastily replied that he could not advice him on such a subject without acting in a double capacity, as he was himself a candidate. The affair of the bridge, which was ultimately built of stone, caused unpleasantness with Mr. Hewes, and Fairbairn left his employment at the end of the following week, determining that henceforth he would be his own master. This was in November, 1817, and as he could ill-afford to be idle even for a single day, he went to Mr. J. Hulme (of Messrs. Otho Hulme, and Co.), of Clayton, near Manchester, for whom he had erected machinery whilst with Mr. Parkinson, and he made him an offer to construct an iron conservatory, which he proposed erecting in his garden. He gladly accepted the offer, and having prepared the drawings, which were approved, he looked around for some clever active person as a partner to join him in the undertaking. This partner he found in an old shopmate—Mr. James Lillie—to whom he communicated his intention, and asked him to join him. Their conservatory affair was soon stopped by a notice from Birmingham that a patent was being infringed. They got one or two small jobs which, however, enabled them to make a lathe, and having hired a miserable shed for about 12s. per week they erected the lathe, and with the assistance of James Murphy, a muscular Irishman, they contrived to finish the whole of their work in a very creditable manner.

At that time—1817—even Manchester did not boast of many lathes or tools except small ones in the machine shops. Theirs was of considerable dimensions, and capable of turning shafts of from 3 to 6 in. diameter. For two years afterwards this lathe did the whole of their turning work. Amongst others he called upon Messrs. Adam and George Murray, the extensive cotton spinners. Mr. Murray received him kindly, looked at his drawings, and told him to call next day with his partner. On the following day Mr. Murray took them through the mill, and asked them if they could renew with horizontal cross shafts the whole of his millwork that turned the mule spinning. They gladly agreed, but before any contract was made he stipulated that the work must be well done, and said that he would visit their shop on the following day, and judge for himself as to the means they had at command for the attainment of that object. This proposition was anything but encouraging, as both of them were aware of the poverty of the land, and the risk they would incur by such an exhibition. There was, however, no alternative; come he would, and immediately on their return they set to work to put the house in order for his reception. On the following day he came punctually to the time, and after looking round he observed that there was no approach but through an entry about 4 ft. wide, and that having but one tool they would never be able to execute a work of such magnitude. They earnestly assured him to the contrary, and having made an agreement with him, they commenced with glad hearts and willing minds what they considered their first and best order as men of business. One of the conditions was to execute the alterations without stopping the machinery, or only such portion as they might require for the time being. This they accomplished satisfactorily, and having worked from five in the morning till nine at night, they completed the order within the specified time, and in such a manner as to satisfy Mr. Murray and his friends.

The alteration effected in Mr. Murray's factory opened a new field for their exertions. Up to that time neither Mr. Lillie nor he were much acquainted with cotton-mills, their previous employment having been chiefly confined to corn-mills, printing works, and bleaching works; and the operations of spinning being nearly new, they had everything to learn in that extensive department of our national industry. The alterations in Mr. Murray's mill gave them a great deal of insight into the business, and as Fairbairn's department lay in the designs and erection of the work as sent out by Mr. Lillie from the shop, he had an opportunity of examining with care and attention the whole of the main gearing, and the machinery of transmission to the remotest parts of the factory. In his examination of Mr. Murray's mill and others to which he had access, he thought he discovered great defects in the principle as well as in the construction of the millwork. All the cotton mills which he had seen were driven with large square shafts and wooden drums, some of them 4 ft. in diameter. The main shafts seldom exceeded 40 revolutions per minute, and although the machinery varied in velocity from 100 up 3000 revolutions, the speeds were mostly got up by a series of straps and counter drums, which not only crowded the rooms, but seriously obstructed the light where most required in the more delicate and refined operations of the different machines. This defect he mentioned to Mr. Lillie, and proposed that they should change the system by the introduction of lighter shafts at double or treble velocity, and by using smaller drums to drive the machinery at the same speed. He instanced an argument which he had had with a spinner, who contended that the straps would slip on small drums, but he showed that the front wheels of a carriage, though much smaller than those behind, went over the same ground, and that the quick shafts and smaller drums would not only by their increased velocity do the same, but would do it with a great saving of power. Thoroughly convinced of this they set to work, and from that time he dates the revolution which followed, and their own prosperity as the leading millwrights of the district.

The completion of Mr. Murray's business gave a new impetus to their business. He immediately recommended them to the attention of Mr. John Kennedy, partner in the firm of Messrs. M'Connel and Kennedy, then the largest spinners in the kingdom. They were on the point of building a new mill, and owing to Mr. Murray's recommendation they found no difficulty in making arrangements with Mr. Kennedy. The erection of M'Connel and Kennedy's new mill was a great step in advance; they had now become engineers and millwrights of some consequence, and the complete and satisfactory execution of the millwork established their characters as young men who were likely not only to do well, but also to introduce improvements in the construction and machinery of millwork, and the general mechanism of other branches of industry. Mr. Kennedy recommended them to all his friends, and orders poured in from all sides, giving them an amount of work greater than they could execute. They had removed from the shed to an old building in Mather-street, but were still without a steam-engine, or any other power except Murphy and three other assistants who turned the lathes. Four or five years passed in this manner, and though they were always short of money, and had to work from hand to mouth, they were, nevertheless, in a prosperous way of business. Their tools were increasing in number, new patterns were made, and at the end of five years they found themselves worth (in material, stock, and tools) 5000*l.* It was true there was no ready money, but having occasional assistance from Heywood's Bank, they ventured on the purchase of a 16 horse power second-hand Boulton and Watt's engine, bought a small plot of land on chief rent, and erected a more convenient and commodious workshop.

From this time Fairbairn's career was one of continued progress, and the manner in which the record is given in Prof. Pole's volume is most attractive. The utility of Fairbrain's labours are already known in the volumes of researches which have from time to time been published under his name, and the biography is particularly interesting, as showing the many difficulties which had to be encountered to attain the results sought, and the manner in which they were overcome. The work will doubtless be widely read, and will certainly serve to encourage many who would despair of achieving celebrity from the delays and disappointments met with.

THE PARIS SCHOOL OF MINES.

PROF. CALLON'S LECTURES ON MINING.

The large number of students who derived advantage from the admirable lectures of Prof. Callon during his long occupancy of a professorial chair at the Ecole des Mines caused his name to be known wherever French engineers are employed in mining undertakings, and the fact that his biographers are enabled to write that "method and order were the guiding principles of Callon's professional career, and in him these qualities were combined with unflagging attention to duty and to work" will suffice to satisfy the mining students of this country that his mining lectures are well worth reading. A complete translation of these has been made by two of Her Majesty's Inspectors of Mines—Dr. Clement Le Neve Foster and Mr. W. Galloway—and the first volume* has now been published. It appears that Pierre Jules Callon, a grandson of an English engineer who settled in Normandy, was born in 1815 in the neighbourhood of Rouen, and died at Paris in June, 1875. He was educated at Paris at the Polytechnic and Mining Schools, and in 1839 was appointed professor at the Ecole des mineurs de Saint-Etienne; transferred to the Ecole des maitres-onvriers mineurs at Alais in 1845; and in 1848 to the Ecole des mines, Paris, where until 1856 he was assistant professor of Mining and Mechanics, then becoming ordinary professor until 1872, when failing health compelled him to obtain leave of absence.

The Professor states that he has endeavoured to give his work a practical character, and to descibe the most recent improvements which have been introduced into the art of mining. These improvements have been very great during the last 30 or 40 years, and if we compare a colliery of the year 1830 with one of the immense establishments which have sprung up in various countries of late, we might almost say that they have nothing in common but the objects for which they were created—the production of coal. They are essentially different in many respects; in the scale on which the output is carried on, in the power, and even in the very nature of the means employed. Thus, the power of pumping and winding engines, especially the latter, has been greatly augmented; ingenious mechanical appliances have been invented for ventilating the workings, methods of working especially for thick deposits have been studied, and improved; the mechanical preparation of ores has been entirely remodelled, new processes have been contrived for traversing ground hitherto impassable, and there have been important alterations in the means themselves, the means for raising and lowering the workmen, underground haulage, and even the manual operations of the miners in their working places, have all been re-modelled, or are in course of being modified in a more or less complete manner.

The object of making these various changes in the art of mining as well as in other industries is, he explains, to reduce the general expenses by concentrating and increasing the means of production, and to economise manual labour by the gradual introduction of machinery. It may be justly said that mining is an industry which is eminently susceptible of improvements of this kind, not only because there is usually no lack of capital to assist in carrying them out, and no want of intelligence and ability in the management, but also because it has been necessary in a general way to endeavour to make the supply keep pace with the demand, rather than to find a market for the products and to derive means to combat the scarcity of workmen, rather than to find employment for all the available hands. It may even, he continues, be said that with a constantly and rapidly increasing consumption it will become more and more difficult, and may soon become impossible, at least in the case of certain products, to maintain an equilibrium between demand and supply on account of the double difficulty arising from the limited area of the coal fields and the scarcity of workmen. A knowledge of the various means which may retard or prevent this disturbance of equilibrium is, therefore, indispensable to the miner, and the importance of applying them with intelligence is so great that it may be ranked as a matter of public interest. The object of Prof. Callon's lectures was to provide his students with details which should enable them intelligently to apply in practice the means at their disposal.

In defining mining Prof. Callon states that in an economic point of view the art of mining constitutes an industry of the greatest importance, whether on account of the value of the products created every year or on account of their nature, which has rendered many of them objects of the first necessity. It has been so since the moment that men ceased to live in the savage state, built themselves settled dwellings, and began to make tools. In a scientific point of view it may be said that the art of mining has been the direct cause of the birth and progress of several natural sciences, especially of mineralogy and geology. Lastly, in a technical point of view, it is certain that we owe to the working of mines and to the material difficulties, often considerable, against which the miner has to contend, many ingenious, daring, and powerful processes which have afterwards passed into the general domain of industry. Thus, in the middle ages it was for mines that the first works for husbanding water as a motive-power were made, and the first hydraulic machines set to work on rational principles; it was also for mines that the first steam-engines were set to work about a century ago, and the first railroads established, and lastly the necessities of working and dressing have caused apparatus for ventilating, sorting, classification, &c., to be invented and multiplied, from which general industry has since derived its profit. Even at the present day, in spite of the progress realised by industry in so many different directions, a large mine in full work, with its apparatus for pumping and winding, its means of ventilation, its machines for raising and lowering its workmen, and for dressing the minerals offers one of the most remarkable specimens of human activity, and its triumph over matter.

The definitions and introduction having been disposed of, there is a chapter giving various examples of deposits chiefly continental, in which the reference to Cornwall is certainly not calculated to give a high opinion of the Professor's accuracy, although the translators have remedied the defect by inserting the requisite notes. The succeeding chapter is a much more valuable one, and treats of prospecting or search for minerals and exploratory workings. The search for minerals in any given district should not, he says, be undertaken unless there be some previous indication as a reason for it, because, save the most ordinary building materials, the mineral substances to which the art of mining is applied are sparingly distributed in nature, and in any given point of the earth's surface we are authorised to suppose a *priori*, that these substances do not exist. The positive and negative indications to be considered in prospecting are mentioned. There is a chapter on prospecting by boring, and one on breaking ground, followed by another on the application of machinery to breaking ground, in which several of the earlier machines for boring and coal cutting are mentioned; but the particulars are very stale, given in a very commonplace manner, the most important observation being that the importance of machines for superseding the miner's labour cannot be calculated in a general manner, because it will depend essentially on local circumstances; all that can be said is that this importance will increase very rapidly for coal-cutting machines in proportion as the seams worked are regular in their mode of occurence, and for perforators in proportion, as the rocks to be driven through become harder. In the chapter on timbering and walling, the qualities and properties of the woods of various timber and fruit trees, and some numerical data are given with regard to timbering and walling; and as the metre is taken as equivalent to the yard, and the frame at 10d., the error is not much more than 10 per cent., whilst the prices given being those paid in France, adds vastly to the value of the information given. Some very interesting facts are given in the succeeding chapter—on making and supporting excavations of special forms or dimensions. A gin chamber is a sort of disc placed horizontally; a chamber for a water-wheel is a space of similar form placed vertically. In any given case very careful study will be required in order to decide whether it is preferable to drive a tunnel from the ends only, or by sinking intermediate shafts so as to be able to work several faces simultaneously. The chapter on making and supporting excavations in very watery ground contains notices of ordinary tubbing, Triger's, Guibal's, and Kind and Chaudron's systems of boring, and the use of two shafts is advocated. The remaining chapters are devoted to general remarks on laying out, opening up, and working a mine, and to a description of the principal methods of working.

As indicating the position of mining engineering knowledge in France the volume will prove extremely useful. That the French are, as miners, far behind both English and Germans there will be no question after reading these lectures, but if they contain little that has not long been known to everyone in the profession in this country, they have the enormous advantage of being written in a thoroughly popular and easy style, which will commend itself to working miners, and those connected with the management of mines, who have not had the benefit of a systematic technical education. There is nothing but what they will readily understand, especially as the 40 plates of drawings which accompany the volume render the explanations particularly clear, whilst an acquaintance with the contents of the book will be extremely useful to them in enabling them to perform their duties more satisfactorily. The translation is most carefully done, and although the volume is printed in France, it is very free from errors. The circulation of the work among Cornishmen is calculated to produce a highly beneficial effect, and as it is likely to prove far more suited to their capacities and tastes than the more elaborate productions of the German mining authorities, Messrs. Foster and Galloway are entitled to their best thanks for having translated it.

EXTENSION OF THE AUSTRALIAN COAL FIELD.

Referring to the report of the Australian Agricultural Company, noticed in last week's Journal, Mr. REGINALD H. PRANCE observes that as Mr. Mackenzie's report is dated Sept. 26, further information either by letter or telegraph should, in his opinion, be forthcoming, as Mr. Mackenzie writes: "One or two months will, I hope, enable me to find out the relative positions of the strata proved at Sawyer's Point and that to the north of Stroud, in which we have found seams of coal." In February, 1876, at the Newcastle Colliery, the directors state that on the company's freehold between the Big Fault and the Beach, the coal seam, which was found to be nearly 14 ft. thick, was reached at a depth of 181 ft. Surely the time has already arrived not only to "fix the site of a new winning," but also at once to order the sinking of a new pit, with the necessary adjuncts. To do this, and for other purposes, further capital will be required. Mr. Prance still adheres to his opinion that for an energetic prosecution of the works of the minerals of the company it is desirable to sever the company into two portions—the one to develope the agricultural resources of the company, and the other the mineral. Mr. Prance is willing, however, to adopt the suggestion of a valued friend that—"In lieu of the present share capital of 500,000*l.*, represented by 20,000 shares of 25*l.* each, on which 21*l.* 10s. has been paid, to increase the amount of share capital to 800,000*l.*, to be represented by 20,000 shares of 20*l.* each, fully paid-up, and 20,000 shares of 20*l.* each, 1*l.* 10s. paid up, leaving a balance of 18*l.* 10s. to be called up as occasion may require." This, it will be observed, gives a further amount of 300,000*l.* capital for future requirements.

It must be manifest to proprietors (Mr. Prance continues) that there would be an advantage in this re-adjustment of the capital. At present there is inconvenience to the proprietors and trustees in holding shares not fully paid-up. If this diversion be effected paid-up shares would be available for proprietors for all trust purposes, and a slight share not fully paid-up would suit the requirement of holders who take a speculative, and, as he does, a sanguine view of the future of this company. He feels sure, although he does not advocate the prosecution of the railway by the company, that the right thing is to carry a railway through the Port Stephens estate, *via* Gloucester, Stroud, &c., to the company's North Arm Harbour at Port Denison. One thing more to notice is the despatch of Mr. Gregson, dated July 6, relative to the gold discoveries at Back Creek, Barrington River, near Gloucester, in which a nugget is mentioned of 7 ozs. Back Creek diggings appear to be going on satisfactorily. Should this be the case it is reasonable to suppose that population will be attracted to Gloucester on the company's property, and render a direct railway route to the deep ocean port of Port Stephens almost an imperative necessity. The Sydney Morning Herald, of Nov. 17, states that the warm weather has set in, and a number of diggers are finding their way back to the Back Creek diggings. Good accounts continue to be received from there, and a good deal of gold has been sent away. Several reefs are spoken of as likely to turn out very rich, and are now being worked. It is only hoped a payable reef may be the reward of those who have been labouring several months in sinking shafts, &c. A party of three have been very fortunate to come across another very fine nugget, weighing over 32 ozs.—this one exceeds the one reported some time ago by 6 ozs. We are also informed that the same party have taken over 100 ozs. out of the same claim since they have been working there. Rations and other necessaries are plentiful, and still at the same moderate prices as when the rush first took place. In conclusion, Mr. Prance suggests that the Governor put himself in communication with the Prime Minister of the colony, offering, if necessary, to give the land required for the railway and terminus to the Government, on the condition that they construct a railway in a similar way to those they have already carried out so successfully.

VICTORIAN MINES AND MINERS.—Reference has several times been made to the interesting "Notes on the Colony of Victoria," prepared annually by Mr. H. H. Hayter, the Government Statist, and the issue of the revised edition for 1876 (for a copy of which we are indebted to the Agent General of the colony in this country) affords an opportunity of noticing one or two curious facts which are recorded. There are 52,411 gold miners in the colony, and only 353 of these were returned in the census lists as having been previously connected with any description of mining. The past occupations of 6011 were noted as farmers, farm labourers, &c.; sailors and others connected with the sea have become miners to the number of 3845; general labourers, 1135; carpenters, 795; shopkeepers, 487; commercial clerks and salesmen, 412; butchers, 401; blacksmiths, 392, and so on. As to the occupation of those possessing university degrees, there is an Oxford B.A. working as a farm servant, and a Cambridge B.A. employed as a grocer. Nearly one-fourth of the aborignes are returned as Christians, and more than one-third of these belong to the Church of England, and about one-third are Presbyterians. At the end of the year under review 76 leases to work upon Crown lands for metals and minerals other than gold. These included 21 for antimony mines, 18 for coal, 12 for tin and the ores of tin, 9 for slate properties, 7 for silver, silver-lead, &c., and 1 for kaolin. The average rate of wages paid to miners in 1874 was from 2*l.* 5s. to 2*l.* 10s. per week, without rations. The value of the gold raised was 4,623,888*l.*, and that of the other metals and minerals 35,453*l.*=4,659,341*l.* Free libraries, Athenæums, or Mechanics or Literary Institutes exist in most of the towns of the colony. These institutions numbered 130 in 1874, and over a million visits were paid in that year to 68 of their number which kept visitors' books. The number of volumes they possessed in 1884 was 174,103, of which over 13,000 were presented by private persons. The cost of the buildings was 90,280*l.* The quantity of information contained in the volume (which can be obtained of Messrs. Trübner, of Ludgate Hill) is enormous, and both intending emigrants and those already interested in the progress of the colony will derive much advantage from the careful study of it, especially as the particulars given are thoroughly reliable.

* "Anthracen: its Constitution, Properties, Manufacture, and Derivatives, including Artificial Alizarin, Anthrapurpurin, with their applications in dyeing and printing." By G. AUERBACH. Translated and edited from the revised manuscript of the author by Wm. Crookes, F.R.S. London: Longmans, Green, and Co.

† "The Life of Sir Wm. Fairbairn, Bart., F.R.S., LL.D., D.C.L., &c." Partly written by himself, edited and and completed by WM. POLE, F.R.S. With portrait. London: Longmans.

* "Lectures on Mining, delivered at the School of Mines, Paris." By J. CALLON, Inspector-General of Mines. Translated, at the author's request, by C. Le Neve Foster, D.Sc., and W. Galloway, Her Majesty's Inspectors of Mines. London: Dulau and Co., Soho-square.

FOREIGN MINING AND METALLURGY.

It is depressing to be unable to report any improvement in the French coal trade, but as faithful chroniclers we are constrained to state that no such improvement has taken place. At Paris the weather has ruled remarkably mild and open, and no advance has, in consequence, been possible in domestic qualities of coal. Good ordinary domestic coal has brought 36s. 8d. per ton at Paris, delivered at the residence of the purchaser. As regards industrial coal it is certainly in somewhat more demand than domestic coal, but still business is sluggish, and there are heavy stocks on hand. A fresh fall in prices has been consented to in the Pas-de-Calais—that is, such a reduction has been semi-officially announced, although it had been previously admitted. In the basin of the Loire there has been no sensible change in the coal trade; the consumption remains tolerably regular, but there has been scarcely any export movement.

Sales are reduced to a minimum in the Belgian coal trade. Stocks are not, however, very considerable, working operations having been rather materially curtailed and reduced. Some Belgian colliery proprietors are now employing the greater part of their workpeople in preparatory operations, and they could now, if need be, work on for two or three years without doing any more in this respect. The winter being now regarded as practically over domestic qualities of coal have been offered at Brussels upon sensibly lower terms. The Meuse Workshops Company has undertaken the construction of two intermittent rotarary drainage engines.

Contracts for 25 tenders for locomotives have been let this week at Brussels in two lots. The first lot comprised ten tenders, and the lowest offer for them (176*l.* per tender) was delivered by the Haine St. Pierre Forges, Ironworks, and Foundries Company. The second lot comprised 15 tenders, and the lowest offer for them (169*l.* per tender) was again delivered by the Haine St. Pierre Forges, Ironworks, and Foundries Company. The other offers made were sensibly higher, and the fact is regarded as an indication on the part of Belgian industrials that they have come to the conclusion that they have reached the very lowest point at which they can possibly afford to work. The John Cockerill Company tendered recently for four lots of Bessemer steel rails to be delivered to Hanoverian railways—4556 tons in all. The results of this effort on the part of the Cockerill Company have not at present transpired. A contract for iron pipes required for works of canalisation at Bordeaux has just been let to the Marquise Company (France) at 7*l.* 3s. 9d. per ton, delivered at Bordeaux. In order to have been placed on an equality with these terms Belgian works must have tendered at much lower rates; and although some Belgian tenders were delivered, they failed, upon the whole, to comply with this condition. At the last meeting of the Society of Engineers, trained at the Liége School, there was some discussion on the manufacture of steel-wire cables.

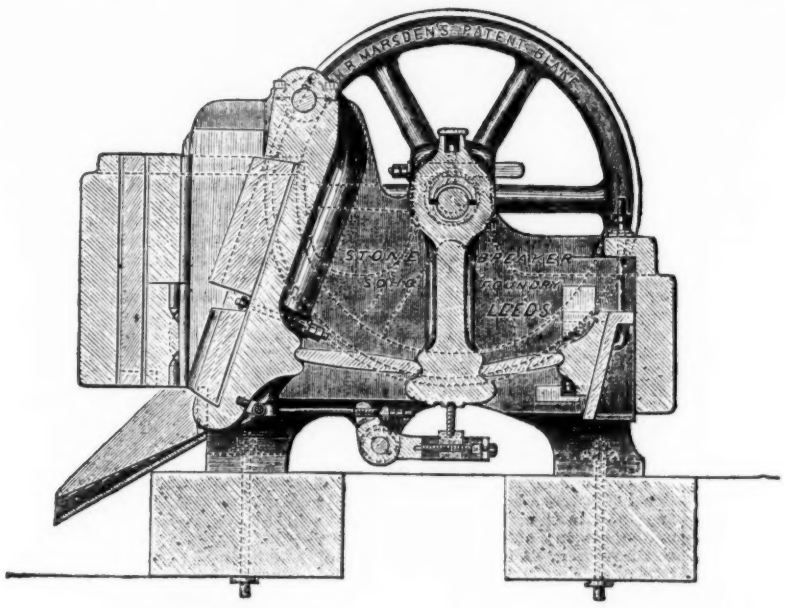
The French iron trade has now reached the period of the year at which some rather large orders usually arrive, but this year only small orders have come to hand, and there is a certain amount of discontent in consequence. Although hopes are entertained in some quarters that the prolonged depression in business is at last drawing to a close prices remain very low, and limited orders are only given out from day to day. At Paris first-class iron is quoted at 7*l.* 12s. per ton, in the Nord the corresponding quotation is 6*l.* 16s. per ton. Some works are devoting more attention to the production of merchants' iron, and are occupying themselves less with the manufacture of rails. The Trith St. Leger Company, which already manufactures 1000 tons of iron per month, will in March be able to triple its production, with the aid of its Valenciennes rolling-mills. A good deal of attention is being directed in the East of France to projects for the re-constitution of the Prince Henri Railway Company, as it is feared that if the working fell into the hands of the management of the German lines in Alsace and Lorraine there would be an advance in rates on the Esch and Athus line, which would prove prejudicial to certain works in the eastern departments of France. Mr. Bessemer recently commenced proceedings against the Anzin Company at Valenciennes, and against the Creusot Company at Lyons, for working his patents for the fusion and running of steel. Mr. Bessemer appears, however, to have failed in these proceedings.

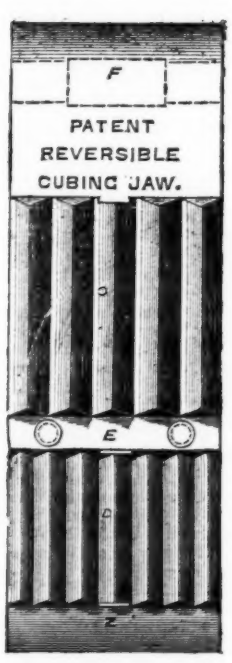
Quotations for copper have ruled rather feeble at Paris. Chilian in bars, with delivery at Havre, has made 78*l.* 14s. per ton; ditto ordinary descriptions, 76*l.* 16s. per ton; ditto in ingots, 80*l.* per ton; English best selected, 81*l.* per ton; and pure Corocoro minerals, 70*l.* per ton. The German copper markets have been generally quiet. Tin has remained weak at Rotterdam, and prices have been scarcely maintained. Banca has declined to 43¼ fl., and Billiton to 42¼ fl. Upon the Paris tin market some weakness has been noticeable. Banca, delivered at Havre or Paris, has made 80*l.* per ton; Billiton and Australian, 78*l.* per ton; Straits, 80*l.* per ton; and English, delivered at Havre or Rouen, 78*l.* per ton. The German tin markets have been inactive. Lead has fallen about 8s. per ton at Paris, but the German lead markets have been pretty well sustained. Zinc has been quiet, and without much firmness at Paris. The German zinc markets have also been quiet.

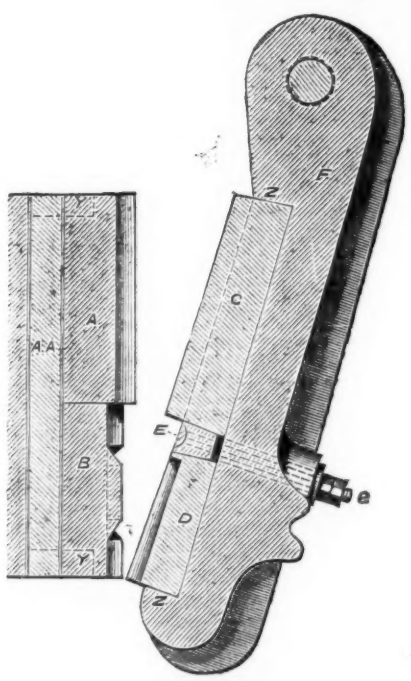
TERRIBLE COLLIERY EXPLOSION IN FRANCE.—An explosion of fire-damp occurred on Wednesday, in the colliery of Graissessac, a village in the department of Hérault. Out of 60 miners who were in the pit at the time, only five have been saved. The work of recovering the bodies is being proceeded with.

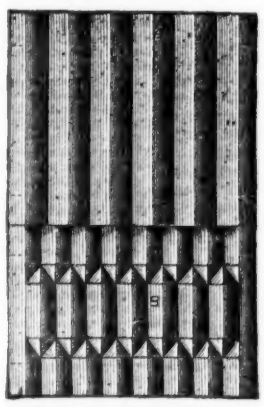
HOLLOWAY'S PILLS—GOOD SPIRITS.—Everyone has frequently experienced sudden personal changes from gaity to gloom. The wind and weather oftentimes receive the blame when a faulty digestion is alone the cause of depression. Holloway's Pills can be honestly recommended for regulating a disordered stomach and improving digestion. They entirely remove the sense of fulness and oppression after eating. They clear the furred tongue, and act as a wholesome stimulant to the liver, and as gentle aperient to the bowels. They healthfully rouse both body and mind. Holloway's Pills are the best known antidotes for want of appetite, nausea, flatulency, heartburn, langour, depression, and that apathy so characteristic of chronic derangement of the digestion.

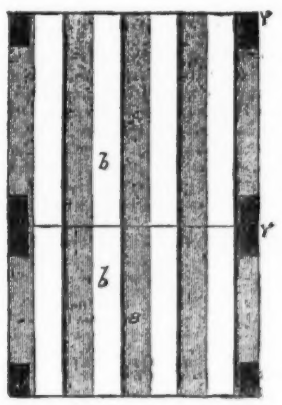
BLAKE'S NEW PATENT STONE BREAKER.

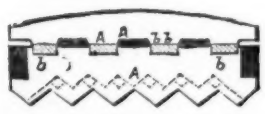












BLAKE'S NEW PATENT STONE BREAKER.

For many years past Blake's Stone Breaker has been regarded as an almost indispensable portion of mining plant, but, like all things human, it has been found open to improvement, and the constantly increasing use of the machine may probably be attributed to the unceasing energy of MR. MARSDEN in at once introducing every improvement in detail which suggested itself to him whilst watching the practical working of the machine in its numerous applications. The advantage of the new cubing jaw was at once recognised by practical men, and the further improvement of making the jaws reversible has so materially extended the time during which each jaw will last, even when employed on the hardest of minerals, that it is difficult to see where any further improvement can be hoped for.

Although the machine as now made is as near as may be perfect, it may be observed that perhaps the most important feature in it is noticeable in the cubing jaws and drawback motion, the former being made with wrought-iron strips cast at the back, so as to be accurately fitted and planed. The faces are made in four sections, each of which are made to turn end for end; hence they are called "reversible." This is a very important improvement, as the whole jaw can now be utilised, which was not the case in any of the former jaws. The drawback motion dispenses with the spring, and the whole power of the engine is available, as the jaw is pulled back by an arrangement which cannot get out of order. This machine is thoroughly well finished, only the very best material being used in its manufacture. The jaws are made of the hardest and best chilled metal. The machine is fitted with cubing jaws when required for breaking road metal, by means of which it can be broken equal to hand, or with patent crushing jaws when required for fine crushing. Machines on exactly the same principle are made in detail, no piece weighing over 3 cwts.—336 lbs. They are constructed of very strong faggots of wrought-iron dovetailed together, all the the parts being planed so as to fit accurately. Tie bolts are inserted, which hold the whole together, but are relieved of any strain due to the working of the machine. They are mounted on wheels, with fore carriage and horse shafts, or otherwise if required. They are made for transit on mules' backs in mountainous districts, where no other mode of carriage is available, and are the only machines which have been found to answer the purpose of exportation to districts where heavy machinery cannot be conveniently drawn. They are extremely simple, strong, and durable. The working expenses are light, and the wear and tear 30 per cent. less than any other machinery exported for a similar purpose. A great number of these machines have been made for various colonial railways, and are largely used in the mines of Chili, Peru, California, Brazils, Cape, and elsewhere.

With regard to the working of the machine, the certificates received of its excellent working have been almost innumerable, and we have never heard of an instance in which it has failed to give the utmost satisfaction, and as it is readily adjusted to material of all hardness its application appears to have been almost unlimited. Thus the proprietors of the Hendre Works, near Mold, state that "they have much pleasure in stating that they have had two of the stone-breakers in use, the one for two years and a half and the other for one year and a half. They have been in constant work, breaking about 60 tons of limestone per day each, and requiring little or no repair during the time. They consider it to be the best stone-breaking machine that has been introduced." The opinion of Mr. E. Hunter, of the Goole Pure Tillage Company, is even stronger than this. After nearly 30 years practical experience in grinding nearly every description of mineral phosphates, roman and portland cements, graphite, barytes, &c., he is satisfied that no other yet made public will do the same amount of work with the same power or at so small a cost.

Messrs. Henry Hills and Sons, of Amlwch, consider "it is not only the most economical, but the most handy machine imaginable to have in works where ores have to be crushed." Messrs. John Taylor and Sons, of Queen-street-place, whose authority upon all matters connected with mining is beyond question, appear to have extensively adopted the stone-breaker, and write that their agent at the West Canada Company's mines says that no breaking machine extant can compare with this; and Mr. H. L. Taylor, writing from their Lisburne and East Darren Mines in 1871, after having had two years experience with them, states that the two machines jointly save the labour of from 20 to 25 men, and do the work infinitely better, as the stuff is reduced to a more uniform size, and broken in a more regular shape.

The subjoined testimonial with reference to the working of a machine of this kind illustrates the satisfaction derived from the introduction of it in Chili. Mr. James Phillips, of Chacewater, in Cornwall, writes:—"I have great pleasure in stating that the Patent Stone Breaker I bought of you some three years ago for Sampson Waters and Co. for mines in Chili, continues to do its work well, and gives great satisfaction. It crushes the hardest copper ore-stone, puts its through 1½ in. size by horse-power with great ease. I can safely recommend it to all in want of a crusher. Can be driven by steam or horse-power." Testimonials of this character fill quite a little volume, all being equally satisfactory as to the working of the machine.

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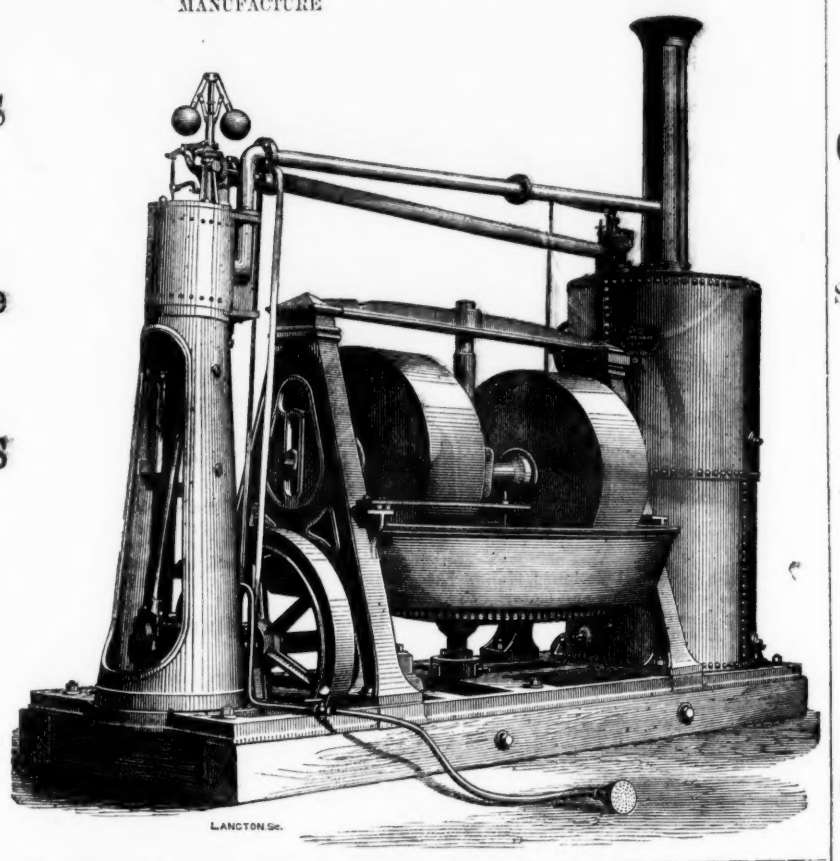

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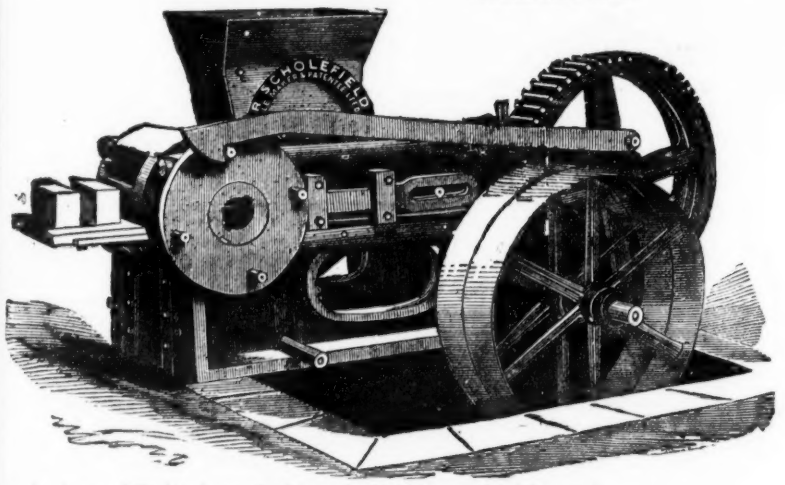
R. SCHOLEFIELD'S
LATEST PATENT BRICK-MAKING MACHINE.

PATENTED 1873.



R. S. begs o call the attention of all Colliery Owners in particular to his PATENT SEMI-DRY BRICK MACHINE, and the economical method of making bricks by his patent machinery from the refuse that is taken from the pits during the process of coal-getting, which, instead of storing at the pit's mouth (and making acres of valuable land useless), is at once made into bricks, at a very small cost, by R. S.'s Patent Brick-making Machinery. If the material is got from the pit hill, the following is about the cost of production, and the hands required to make 10,000 pressed bricks per day:—

2 men digging, each 4s. per day	£0 8 0
1 man grinding, 4s. 6d. per day	0 4 6
1 boy taking off bricks from machine, and placing them in barrow ready for the kiln, 2s. per day	0 2 0
1 boy greasing, 1s. 6d. per day	0 1 6
1 engine-man, 5s. per day	0 5 0
1 man wheeling bricks from machine to kiln, 4s. per day	0 4 0
Total cost of making 10,000 pressed bricks	£1 5 0, or 2s. 6d. per 1000.

(SETTING AND BURNING SAME PRICE AS HAND-MADE BRICKS.)

N.B.—Where the material can be used as it comes from the pit, the cost will be reduced in digging.
As the above Machinery is particularly adapted for the using up of shale, bind, &c., it will be to the advantage of all Colliery Owners to adopt the use of the said Brick-making Machinery.

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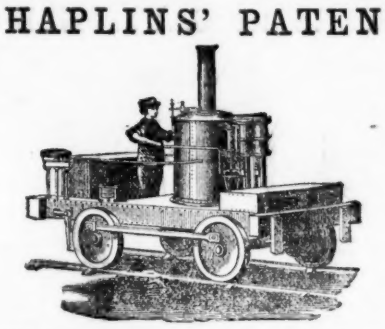

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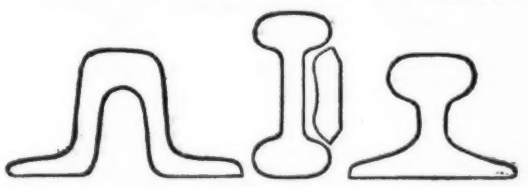

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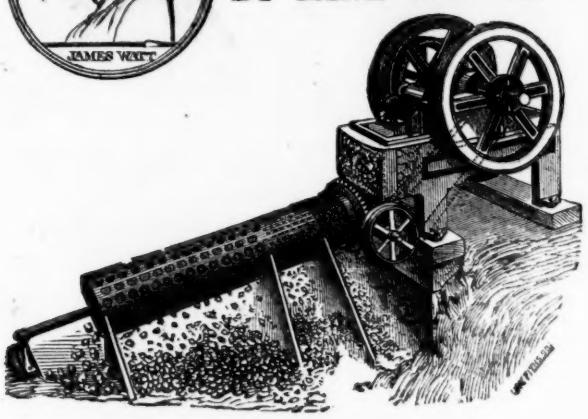

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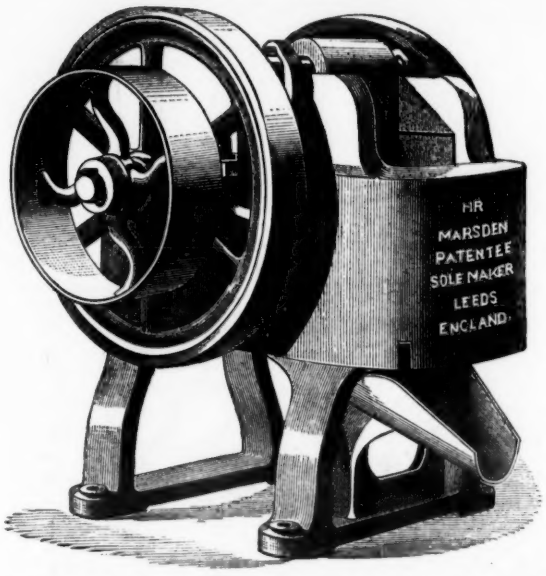

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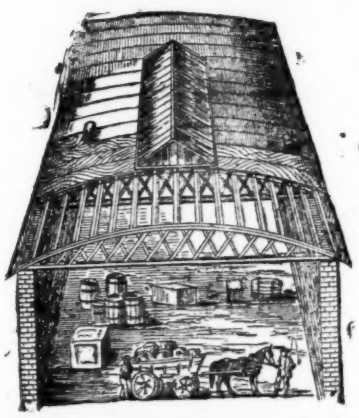

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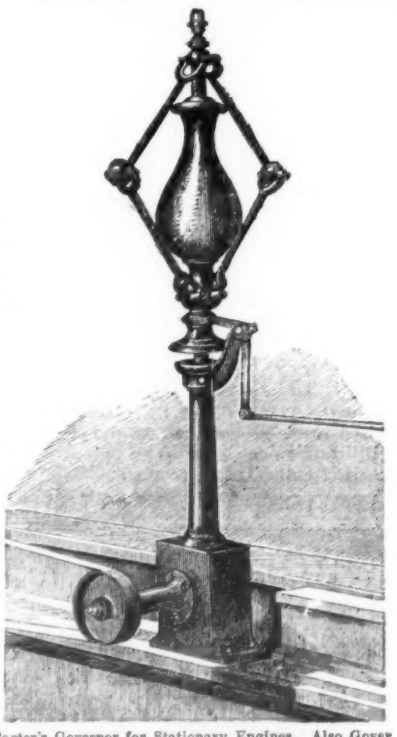

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